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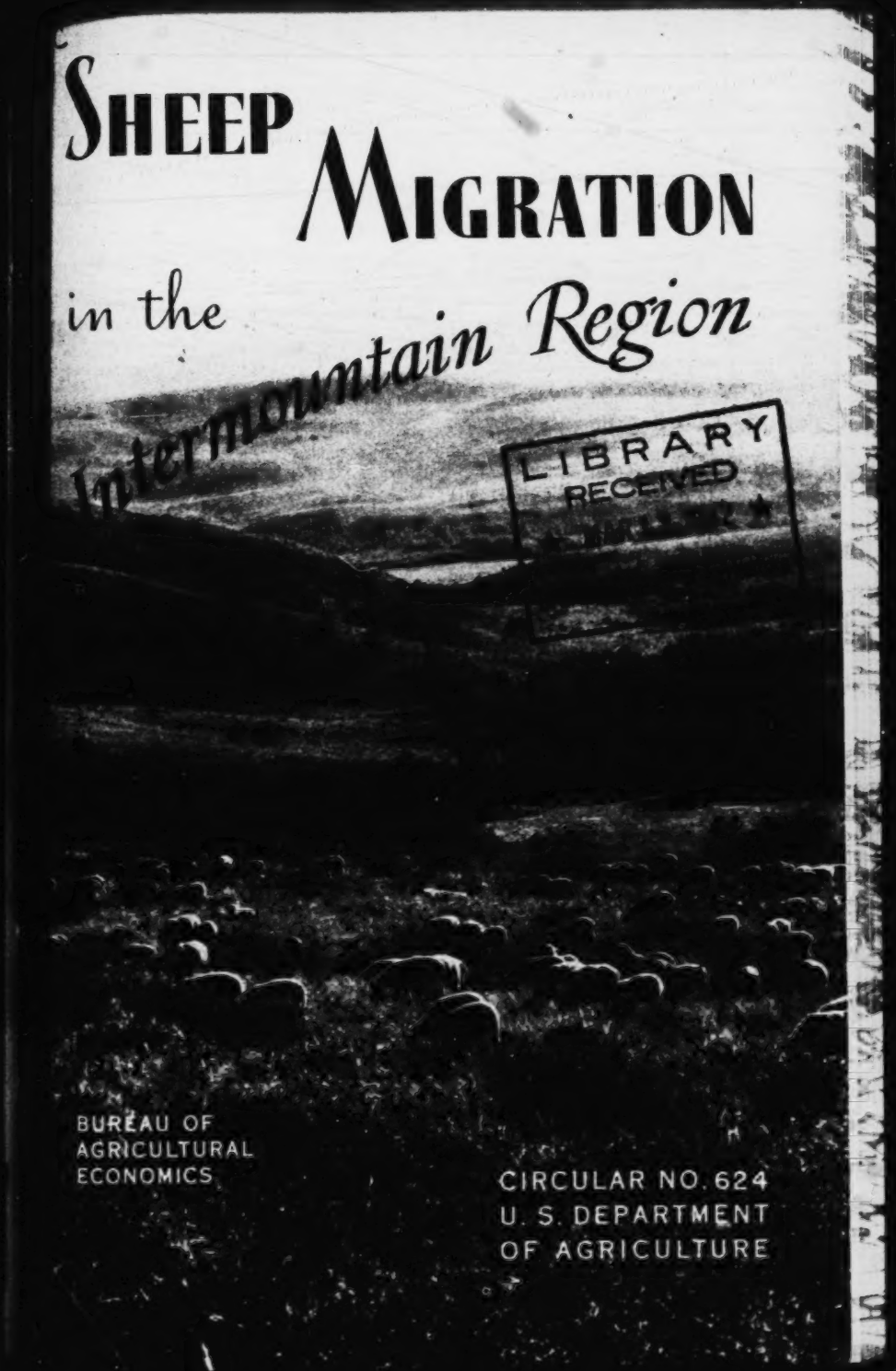
SHEEP MIGRATION in the Intermountain Region



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Sheep Migration in the Intermountain Region

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RANGE LAND—THE FOUNDATION OF AN INDUSTRY

A vast and necessary pasture for the animals that are to produce the meats and other livestock products for the populous East and for the West Coast, might be the characterization of the Intermountain Region. For purposes of this publication the Intermountain Region includes the entire States of Utah and the regulated areas of Nevada, a small part of the northeastern corner of California, the southeastern quarter of Oregon, the country south of the Salmon River in Idaho, the southwestern quarter of Wyoming, the western half of Colorado, and a small part of the northwestern corner of Arizona. Most of the open range lands are semidesert, with green oases of irrigated land and mountain ranges thinly interspersed. In spite of a general appearance of unproductiveness, these range lands are the foundation of the western livestock industry.

Climatic and topographical conditions of this region permit little other agricultural use. Beginning with the introduction of domestic livestock and continuing to the present time in many areas, the

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history of this region has been one of destructive exploitation of the vegetation and soil. This story of the diminution of a great resource is not new to the conservationist. It has passed as a panorama before the eyes of the public-land administrators and the stockmen. Recognition of the problem has not always been followed by amelioration. The stockmen, faced with climatic fluctuations more extreme than any in their previous experience, found it exceedingly difficult to adjust livestock numbers to decreased forage production.

Institutional patterns have now grown to the point where suggested changes in land use must surmount an inflexible barrier of fixed concepts and past use. With continued decline of the soil, the development of a truly great American desert within the next hundred years is entirely possible.

Aside from the fact that these apparently desolate ranges are necessary in the production of livestock, other considerations make them of inestimable value. The millions of acres of range lands constitute important portions of the watersheds of the Colorado, Columbia, and Missouri Rivers. Upon these rivers are built massive dams and other structures for reclamation and the production of power.

Range problems in the Intermountain Region encompass several fields of inquiry. Many of these problems are local in character, whereas others are of such nature that they prevail over large areas. The problem of seasonal range use by sheep and the migration of countless bands of sheep between seasonal ranges is truly regional in scope. The activities of migrating sheep are not confined to any one type or ownership of land, or even to one State.

Adverse effects of these migrations on range lands have long been recognized. In the past the United States Forest Service has studied the migration of sheep in certain areas. With the passage of the Taylor Grazing Act in 1934 and the formation of the Grazing Service of the United States Department of Interior, much more information has been made available on the use of public ranges by sheep.

Information furnished by these agencies made possible the study of sheep migration and range interrelationships here reported. The numerous routes of migration and the volume of sheep passing over each driveway, on all types of land, have been mapped for the Intermountain Region. Migration problems, the various seasonal sheep-range relationships, and some suggested solutions, are now presented.

Range Sheep Important to the Region

Production of lambs and wool by range sheep is one of the chief types of agriculture in the Intermountain Region. In Utah, the sales of mutton, lambs, and wool amounted to $9,267,000 for the calendar year 1938, which was approximately 21 percent of the total agricultural income of the State during that year. Comparable figures for other States included in this study are as follows: Nevada, $2,575,000 or 22 percent; Oregon, $8,946,000 or 9 percent; Idaho, $12,569,000 or 15 percent; Wyoming, $14,688,000 or 35 percent; Colorado, $16,136,000 or 14 percent. In such States as Colorado and Oregon, where the whole States were not studied, the importance of sheep to the part of the State that was covered would be greater than the percentage indicated for the State as a whole.

Range sheep in the Intermountain Region comprise a comparatively large part of the total number of sheep in the range States, and in the entire United States. The number of mature ewes in this region is about 38 percent of the total number of sheep in the 11 Western States, 24 percent of the sheep in all States west of the Mississippi River, and 19 percent of the total number of sheep in the United States.

On the basis of the area of land utilized, range-sheep production in the Intermountain Region is a noteworthy part of the total agricultural production in this region. Most of the land is used for grazing of livestock. As much of the grazing land is used by both cattle and sheep, it is impossible to ascertain the exact area utilized by either class of stock alone. On the basis of the best estimates available, it seems probable that forage was produced on about 85 percent of the total area of land in the Intermountain Region, and sheep obtained some forage from at least 65 percent of the total area.

Sheep use considerably less than 65 percent of all the forage produced in the region. However, irrigated lands produce much more forage per acre than do range lands, and sheep use relatively little hay and pasture from irrigated lands. Areas where hay feeding of sheep is heavy are noted later.

The Region and the Grazing Areas

The Federal Government owns approximately 80 percent of the 215,000,000 acres in the Intermountain Region. More than four-fifths of this Federal land is grazed by livestock. The Grazing Service of the United States Department of the Interior administers the largest body of public lands—approximately 105,000,000 acres. These lands are mostly winter range, but they include some spring-fall and summer range. The Forest Service controls, in the Intermountain Region, about 44,000,000 acres of land, most of which is summer range. Location of Federal lands in the country covered by this study is indicated in figure 1.

Because such a large proportion of the grazing land is under Federal control, nearly all range-sheep operators in the region graze their sheep on Federal lands at least part of the year. The statistical data [1] for this study were obtained from the 1938–39 sheep-permit and license records of the Forest Service of the Department of Agriculture, the Grazing Service, and the Field Service of the Office of Indian Affairs, Department of Interior. Supplementary information was given by various officials of these services.

To explore the variations between and interdependence of various areas, the Intermountain Region was divided into a number of grazing areas. Grazing districts, set up by the Grazing Service, were used as a basis for delineating them. For the most part, grazing areas include a grazing district and any enclosed or immediately adjacent national forest and other Federal and private lands. This method of delineation was used because the average grazing district encompasses a much larger acreage than does a national forest or other type of public land. This method of outlining grazing areas and numbering them from the

[1] A more detailed description of source of data and methods of analysis used in this study is found in the section on Methods and Scope of Study, in the appendix, p. 55. Tables 13 and 14 in the appendix contain basic data.

respective grazing districts in no way implies that one form of Federal landownership is subordinate to, or less important than, another.

Two grazing areas do not contain grazing districts. One is the southeastern Idaho grazing area, the location of which is indicated by the name; it includes several national forests, an Indian Reservation, and much patented land.[2] The other, in northeastern Utah, was termed the Uinta Basin grazing area and includes national forests, an Indian Reservation, and patented lands. The unregulated public

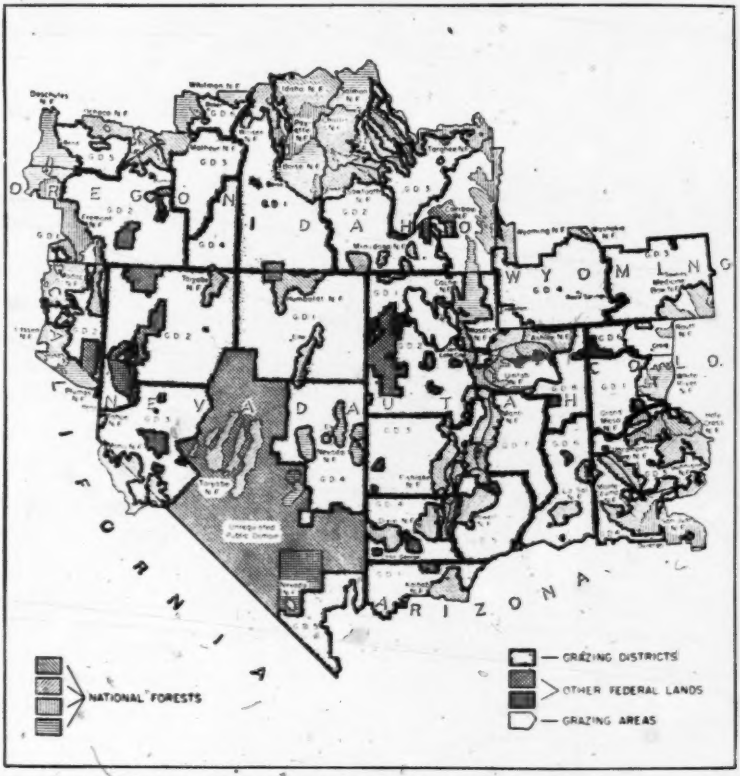

FIGURE 1.—EXTERIOR BOUNDARIES OF FEDERAL LANDS OF THE INTERMOUNTAIN REGION.

Federally controlled lands cover a major part of this region.

domain of Nevada was not analyzed as a grazing area because information was lacking. The term unregulated public domain applies to that part of the unreserved and unappropriated public domain that has not been included in grazing districts for administration; however, this land is subject to lease provisions of the Taylor Grazing Act.

Operators and their sheep were classified in the grazing areas in which they spent the greatest length of time. This was called the

[2] Patented land includes all land separated from the public domain. It may be in private or in State ownership.

operator's "home grazing area."[3] Operators' ranch bases usually are located in their home grazing areas.

SHEEP OPERATIONS RELATED TO NATURAL CONDITIONS

Natural Conditions and Seasonal Ranges

Use of range by sheep is directly related to topography, soils, vegetation, and climate. Within the Intermountain Region the physical factors vary tremendously. Elevations range from 2,000 to well over 10,000 feet. The topography includes rugged mountains, rolling plains, plateaus, basins, and large and small valleys. Precipitation varies from less than 5 inches a year in desert areas to more than 30 in the higher mountains. Soils have been developed largely under arid and semiarid conditions, but they vary from the Sierozem and Desert soils to the gray-brown Podzolic soils of the mountains. The growing season varies from a very short period in the higher mountains to 175 or more days at lower elevations.

SEASONAL RANGES

Most range forage is seasonal in character because of the effect of natural conditions upon the growing season, type of forage, stock-water supply, and snowfall. Ranges of the Intermountain Region are usually separated into three major classes: Summer, spring-fall, and winter—according to the season during which they are generally grazed. All of the seasonal ranges overlap to some extent.

The range types and principal forage species of the seasonal ranges are briefly listed in tabulation[4] on page 6. Only the general aspect of the seasonal range is given and no attempt is made to list all of the cover types and plant species. The months given are the most common ones for sheep, but the exact dates vary from year to year and from one part of the region to another.

Summer ranges of the mountains can be used only during the summer because they are deeply covered with snow the rest of the year. On the other hand, it is necessary to await snowfall before sheep can be taken onto most desert or semidesert areas. Lack of a stock-water supply other than snow forces the use of these ranges during the winter only. Much of the spring-fall range is limited to a short season of use while stock water is available.

In addition to the limitations imposed by absence of livestock water and presence of snow cover, range forage must be protected from deterioration caused by too early use. The concept of range readiness has been defined as "the date in any one year when the range first reaches the condition in which there is sufficient feed to keep livestock in thrifty condition, and when livestock may be admitted without serious impairment of the growth and reproductive processes of the more important forage plants."[5] The question of range

[3] Wherever the term "home area" is used it pertains to that grazing area where the sheep of an operator obtain the greatest proportion of their annual sheep-months grazing and forage. The term has been used to apply to sheep or operators: for example, "home area of sheep" or "home area of operator."

[4] Adapted from SHANTZ and ZON, ATLAS OF AMERICAN AGRICULTURE, PART 1, THE PHYSICAL BASIS OF AGRICULTURE, SECTION E, NATURAL VEGETATION. U. S. Dept. Agr. 1924.

[5] SAMPSON, ARTHUR W., and MALMSTEN, HARRY E. GRAZING PERIODS AND FORAGE PRODUCTION ON THE NATIONAL FORESTS. U. S. Dept. Agr. Bul. 1405, 55 pp., illus. 1926. See p. 8.

readiness is particularly important on summer and spring-fall ranges. Winter ranges are usually ready and the forage plants are in the dormant stage before snowfall makes it possible to use them.

Seasonal range	Range type	Principal plant species
Winter: November, December, January, February, March, April.	Desert shrub	Sagebrush (*Artemisia* spp), shadscale (*Atriplex confertifolia*), creosote bush (*Covillea tridentata*), greasewood (*Sarcobatus vermiculatus*), saltbush (*Atriplex* spp.), and some grasses.
	Pinon-Juniper	Pinon (*Pinus edulis* and *P. monophylla*) and Juniper (*Juniperus* spp.), with varying amounts of browse and grass species.
Spring-fall: May, June, October.	Pinon-Juniper	Do.
	Woodland chaparral	Oak (Quercus gambelii), and numerous shrubs.
	Sagebrush-grass	Sagebrush, rabbitbrush (*Chrysothamnus* spp.), bitterbrush (*Purshia tridentata*), wheatgrasses (*Agropyron* spp.) bluegrass (*Poa secunda*), fescues (*Festuca* spp.), balsamroot (*Balsamorrhiza sagittata*).
Summer: July, August, September.	Open forest	Coniferous species of Douglas-fir, spruce, and pine, and broadleaved species of aspen. Forage consists of browse and many succulent grasses and herbs.

SEASONAL RANGE BALANCE

The ideal sought by each range-sheep operator is to have just the proportionate amount of each seasonal range to care for his sheep the year around. When this condition occurs he has well-balanced seasonal ranges. His sheep are moved from the low winter ranges to the foothill spring ranges; and, finally, to the high summer ranges, as new forage growth develops with the progress of the season. If the ranges are well balanced and the season is favorable, each range is ready in rotation when grazing should cease on the previously used range.

Naturally, the ideal is not always attained. Climatic conditions fluctuate widely from year to year and season to season. Forage growth on one or more of the seasonal ranges may be delayed, and ranges that are well balanced one year may be unbalanced the following year. Frequently there is not a proportionate amount of the various seasonal ranges within short distances of one another. That is, the number of sheep that can be grazed on a particular spring-fall range may be far greater or far smaller than the number that can be run on the nearby summer range.

Whether ranges of an area are temporarily unbalanced by climatic conditions or chronically unbalanced by the lack of enough of one or more of the seasonal ranges, there generally are three major ways

of adjustment. The sheep may be moved longer distances to more remotely located ranges for the seasonal forage that is lacking nearby. This implies the existence of such seasonal range at some remote but accessible point. Another type of adjustment to lack of balance is the overuse or underuse of one of the seasonal ranges; overstocking of ranges may be a useful device to obtain temporary balance, but such a practice, if continued, leads to further unbalance and serious range depletion with numerous attendant economic ills. A third means of adjustment is to use a range at an earlier or later date than the season to which it is best adapted. In most instances this type of use also results in range depletion and serious economic handicaps.

In general, range-livestock operators have been loath to see any seasonal range forage go unutilized for the sake of obtaining a balance with less plentiful types. As a result, overuse and undesirable seasonal use have been far more common than has underuse. Spring-fall

FIGURE 2.—"Designated Livestock Road." This is a common sign along the roads and highways of the Intermountain Region.

ranges have been more seriously affected by this practice than the other seasonal ranges. Sheep have grazed spring-fall ranges too long, waiting for snow to make possible the use of winter range. As most of the summer ranges are regulated by public agencies, the sheep must graze the spring range until permitted to go on public summer range.

SHEEP MIGRATION A RESULT OF SEASONAL RANGES

The sheepman must adapt his operation to the physical conditions of the area; therefore, the sheep must be moved from one seasonal range to another. The length of movement depends upon the distance between the seasonal ranges. Short movements may not follow any established routes, but migrations of sheep between seasonal ranges usually are long and do follow well-established routes (fig. 2). Climatic

and topographic factors that are responsible for the existence of a particular seasonal range may be similar over a large area, hence other seasonal ranges are almost always located some distance away.

Seasonal migrations of sheep are a necessary corollary of the existence of seasonal ranges. Seasonal ranges that are adjacent, or nearly so, are more desirable than those located at considerable distances, other factors being the same. Ranges that are as close together as natural conditions ever permit in the Intermountain Region may nevertheless be a considerable distance apart. A spring-fall range located within 25 miles of a summer range probably is considered "adjacent" by most sheepmen.

Sheep can travel between seasonal ranges much more readily when they can follow canyons or other natural travelways between areas.

FIGURE 3.—Sheep on winter range in southern Nevada. The snow has covered all but the taller browse plants and the animals have difficulty in obtaining forage. The winter range is not always covered with such deep snow, but severe storms are not uncommon.

In some instances it is possible to utilize several different routes between seasonal ranges, but in other instances the physical characteristics almost necessitate the regular use of certain routes.

Natural conditions that are responsible for the seasonal character of range forage in the Intermountain Region are also responsible for some of the hazards incident to their use. This is particularly true of most winter ranges. They can be used only when snow is present to furnish livestock water. Yet, snow is often so deep that sheep find it difficult or impossible to get forage (fig. 3). Sheepmen may give them supplemental feeds, but the death loss is likely to be high. Some spring ranges are hazardous—if the source of livestock water is not reliable or if poisonous plants are found. All of these factors cause certain adaptations in management methods which may vary between grazing areas but operating methods are fairly uniform over large areas.

Operating Methods

SIZE OF BANDS

As sheep are driven between seasonal ranges and are herded while grazing, the size of ewe band on the range is adjusted to the number that can be handled efficiently by one herder. Summer bands usually

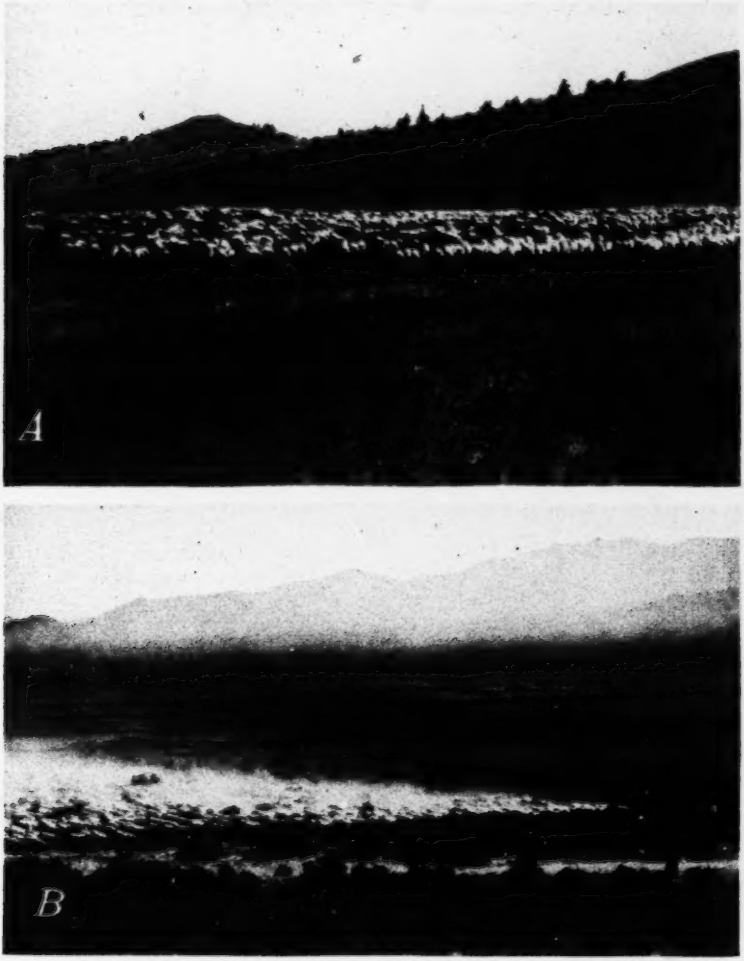

FIGURE 4.—Typical bands of sheep on seasonal ranges: *A*, Summer band on high range in Payette National Forest, Idaho; *B*, winter band in Humboldt County, Nev.

number between 1,000 and 1,250 ewes, plus lambs, making a total of 2,000 to 2,500 animals. A herder cannot properly care for more on the rough summer range, and the management plans of the Forest

Service often prohibit the operation of larger bands. On the comparatively level winter ranges, sheep are herded in bands of 2,000 to 2,500 ewes (fig. 4). The lambs have been sold in the fall or are grown replacements by this time. Thus the total number of sheep of all ages is about the same per band as in the summer. A range-sheep operator who has less than 800 ewes usually finds it uneconomical to operate unless he combines his sheep with those of other operators. The rams are run separately in small bands, generally in fenced pastures on the ranch or nearby.

SIZE OF OPERATIONS

These facts indicate that, for economy in herding, most range operations should include from 1,000 to 2,000 sheep, but the size of operation varies considerably both within each grazing area and between grazing areas (table 1). Nearly two-fifths of the operators included in this study have less than 275 sheep. On the other hand, there are some extremely large operations. Eight operators own more than 25,000 sheep each; 32 operators, more than 10,000 each.

TABLE 1.—*Operators of various grazing areas distributed by numbers of sheep owned, Intermountain Region, 1938–39*

Home area of operators [1]	Operators owning specified numbers of sheep										Total operators
	1–275	276–750	751–1,250	1,251–1,750	1,751–2,250	2,251–2,750	2,751–4,750	4,751–7,750	7,751–12,750	Over 12,750	
	Number	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
Arizona 1	2	0	5	3	2	2	4	2	0	0	20
California 2	6	7	23	3	8	2	6	0	2	0	57
California, other [2]	0	1	5	2	1	1	2	2	0	0	14
Colorado 1	23	17	34	12	11	12	11	4	0	0	124
Colorado 3	76	57	65	11	12	8	13	5	2	0	249
Colorado 4	35	40	65	17	8	6	5	3	0	0	179
Colorado 6	10	9	9	3	4	1	2	3	2	2	45
Colorado, other [2]	0	2	11	1	0	0	2	1	0	0	17
Idaho 1	47	25	19	7	22	4	18	15	9	5	171
Idaho 2	274	99	89	36	35	15	21	9	8	3	589
Idaho 3	54	29	21	8	6	2	8	2	2	0	132
Idaho 4	73	23	28	0	7	2	4	4	0	0	141
Southeastern Idaho	144	70	73	24	21	14	18	7	6	1	378
Nevada 1	4	11	9	4	4	2	17	5	5	5	66
Nevada 2	1	2	4	3	4	3	9	5	2	0	33
Nevada 3	6	5	8	4	13	4	18	6	3	0	67
Nevada 4	9	5	5	6	4	3	8	4	4	0	48
New Mexico [3]	3	6	11	8	5	1	3	1	0	0	38
Oregon 1	4	3	8	4	3	1	1	0	0	0	24
Oregon 2	9	5	19	18	14	16	9	4	0	0	94
Oregon 3	8	2	5	7	7	8	4	5	2	0	48
Oregon 4	5	1	7	3	2	2	5	1	0	0	26
Oregon 5	7	6	16	5	4	1	4	1	0	0	44
Oregon 6	3	2	15	1	4	3	1	0	1	0	30
Oregon, other [2]	0	1	30	4	4	2	6	3	0	0	50
Utah 1	42	34	29	15	16	12	13	6	1	1	169
Utah 2	84	46	40	21	20	19	30	7	4	0	271
Utah 3	578	151	44	17	11	10	25	4	0	0	840
Utah 4	53	46	42	19	14	10	16	4	1	0	205
Utah 5	76	33	12	7	8	3	1	0	1	0	141
Utah 6	3	8	6	6	9	2	5	4	1	2	46
Utah 7	57	32	10	13	7	6	12	2	1	0	140
Utah 8	15	24	17	11	11	7	8	9	0	0	102
Uinta Basin	6	14	2	5	5	4	2	1	0	0	39
Wyoming 3	5	11	14	8	7	4	19	22	15	3	108
Wyoming 4	93	53	26	20	7	10	23	28	9	6	275
Wyoming, other [2]	0	0	3	2	1	2	2	0	1	0	11
Total	1,815	880	829	338	321	204	355	179	82	28	5,031

[1] Classified on basis of area in which sheep obtained the greatest percentage of the year's sheep-months use (see footnote 2, p. 4).

[2] The "other" designations include those operators classified outside of the region studied, but obtaining some use within one or more of the areas designated.

[3] Includes only those operators of New Mexico who are licensed or permitted on Federal lands in Colorado area 4.

Obviously the size of operation is affected by factors other than the efficient size of band necessary for range operation. Small operations are found where natural conditions make irrigated or dry farming possible. On many farms in such areas the running of sheep is simply one of several farm enterprises, and the operators are not entirely dependent on livestock as a source of income. On desert and semidesert areas larger operations occur. Here livestock production is the only form of agriculture possible, forage is extremely sparse, and seasonal ranges are usually far apart. Although the conditions do not necessitate extremely large operations, they do require that a considerable number of sheep be kept.

Variation in average size of operation between grazing areas is better illustrated graphically (fig. 5). Operations generally below

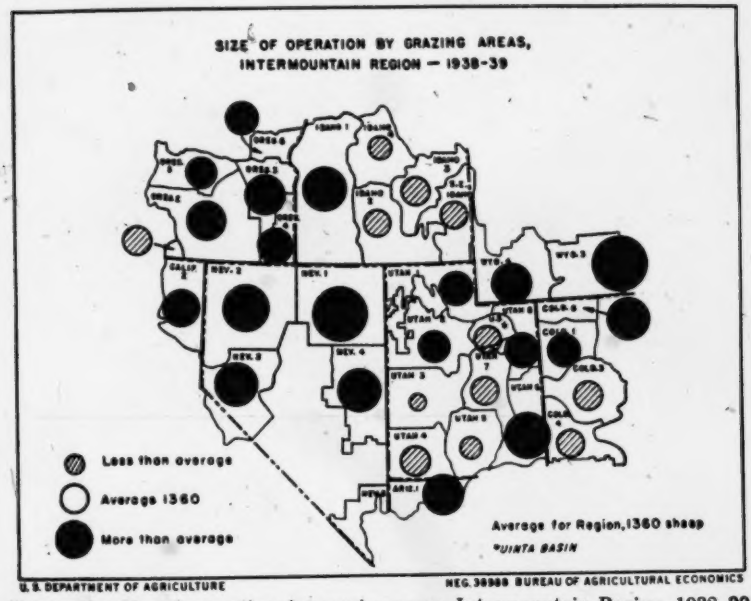

FIGURE 5.—Size of operation, by grazing areas, Intermountain Region, 1938–39. Size of operation is related to natural resources.

average in size are found in the grazing areas of central Utah, where numerous dry-land and irrigated farms are scattered through the mountain valleys running down the center of the State; in central and eastern Idaho, where small operations concentrate along the irrigated Snake River Valley and the valleys of its tributaries; and in grazing areas of southwestern Colorado, where considerable scattered irrigation development is found. Average size of operation is particularly large in the desert areas of south-central Wyoming, in most of Nevada, and in parts of southwestern Idaho, southeastern Oregon, and southeastern Utah.

From the standpoint of total number of sheep involved, large operations are predominant (fig. 6). Almost 62 percent of the total

number of sheep included in the study are owned by 17 percent of the operators, each having 2,250 or more sheep; about 40 percent are owned by 7 percent of the operators, each owning 4,250 or more. Operators who have less than 750 sheep have about 9 percent of the total number of sheep, but represent nearly 54 percent of the operators.

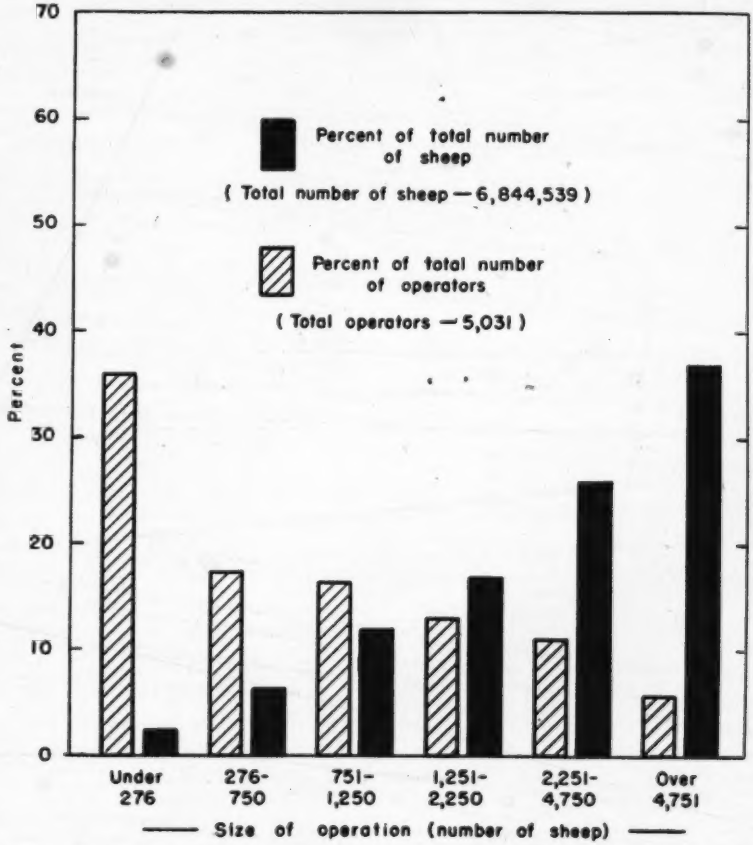

FIGURE 6.—PERCENTAGE OF TOTAL NUMBER OF OPERATORS AND OF SHEEP IN OPERATIONS OF VARIOUS SIZES IN THE INTERMOUNTAIN REGION, 1938-39.

Large operations predominate throughout the Intermountain Region.

SIZE OF OPERATION AND LENGTH OF MIGRATION

There is a fairly direct relationship between size of operation and the distance over which sheep migrate in their seasonal movements (table 2). Although some of the large sheep operators can find enough range within short distances, in general most of them travel greater distances than do small operators. Many small operators use seasonal

ranges only part of the year, for they graze their sheep on farm fields and pastures, and feed during some months. If spring-fall or winter ranges happen to be adjacent, they will use these ranges in conjunction with their fenced pastures and farm lands.

TABLE 2.—*Operators classified by number of sheep and by 1-way trailing distance, Intermountain Region, 1938–39* [1]

Number of sheep per operator	Sheep covering 1-way trailing distance of—						Total operators	Average trailing distance per operator
	1–50 miles	51–100 miles	101–150 miles	151–200 miles	201–250 miles	Over 250 miles		
	Number	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Miles*
1 to 275	976	74	28	5	6	0	1,089	24
276 to 750	492	71	43	29	7	0	642	49
751 to 1,250	390	117	42	24	6	0	579	60
1,251 to 1,750	159	78	36	18	3	0	294	72
1,751 to 2,250	129	77	41	27	4	2	280	85
2,251 to 2,750	65	55	36	25	12	3	196	106
2,751 to 3,750	69	56	40	18	13	5	201	105
3,751 to 4,750	33	36	29	19	10	5	132	121
4,751 to 6,750	34	39	36	17	9	2	137	117
6,751 or more	17	31	44	22	17	7	138	144
Total	2,364	634	375	204	87	24	3,688	[2] 63

[1] Includes only those operators obtaining grazing district or both grazing district and national forest use. National-forest operators who do not obtain grazing-district use are not included.

[2] The average 1-way trailing distance per sheep is 93 miles, when the averages are weighted by number of sheep rather than by number of operators.

As a general rule, small operators who wish to use range at least for a few months consider summer range as the seasonal range most advantageous to them. Whenever irrigated farms are immediately adjacent to national-forest summer ranges, the number of permittees in these national forests who have small flocks is comparatively large. This situation is well illustrated by such national forests as the Manti, Uinta, and Cache in Utah, and the Cache and Caribou in Idaho.

As larger operators are in a far better position to utilize distant ranges, the reasons for lack of correlation between size of operations and trailing distance may be more interesting than the existence of any correlation. Utah grazing area 3 has the smallest average number of sheep per operator, yet the average operator moves his sheep 32 percent farther than the average for the region (table 3). This is partly because the winter-range areas of western Utah lie far from the summer ranges in central Utah. Then, too, small operators in Utah, more than anywhere else, combine their small flocks into efficiently sized bands for long-distance trailing. Similar lack of correlation between number of sheep owned and distance trailed occurs in other Utah grazing areas.

Trailing distances in most of Idaho are shorter because sheep use little or no winter range. Operators send them to spring-fall and summer ranges, pasturing and feeding them on farms and at feed bases in the irrigated sections in southern Idaho during the winter. The average trailing distance for southeastern Idaho is greater than for other areas in this State, because several operators move their sheep as much as 350 miles to winter ranges in eastern and northern Nevada.

TABLE 3.—*Average number of sheep owned and average trailing distance per operator, by grazing areas, Intermountain Region, 1938–39*

Grazing area	Average sheep per operator	Index of average sheep per operator	Average one-way trailing distance per operator	Index of average one-way trailing distance per operator
	Number		*Miles*	
Arizona 1	2,200	162	71	113
California 2	1,738	128	70	111
Colorado 1	1,441	106	76	121
Colorado 3	1,040	76	40	63
Colorado 4	1,003	74	52	83
Colorado 6	2,452	180	61	97
Idaho 1	2,668	196	58	92
Idaho 2	993	73	32	51
Idaho 3	1,012	74	42	67
Idaho 4	728	54	22	35
Southeast Idaho	1,109	82	76	121
Nevada 1	4,325	318	121	192
Nevada 2	3,118	229	62	98
Nevada 3	2,638	194	66	105
Nevada 4	2,587	190	60	95
Oregon 1	1,249	92	38	60
Oregon 2	1,937	142	63	100
Oregon 3	2,335	172	72	114
Oregon 4	1,775	131	37	59
Oregon 5	1,354	100	40	63
Oregon 6	1,552	114	29	46
Utah 1	1,760	115	80	127
Utah 2	1,403	103	111	176
Utah 3	415	31	83	132
Utah 4	1,172	86	49	78
Utah 5	598	44	43	68
Utah 6	2,928	215	100	159
Utah 7	1,046	77	76	121
Utah 8	1,595	117	64	102
Uinta Basin	1,278	94	103	163
Wyoming 3	4,186	308	85	135
Wyoming 4	2,226	164	66	105
Intermountain Region	1,360	100	63	100

MANAGEMENT PRACTICES

Range sheep are sheared in the spring, the date depending upon the climatic conditions of the particular area. Most sheep are sheared in April, May, and June. Lambs are born during the same months. In some parts of the region, particularly in parts of Idaho, lambing in sheds is possible as early as January and February because the equipment and feeds are available and the ewes are not on open range during the winter. This early "shed lambing" puts the lambs on the early high-priced markets.

Natural conditions also influence the relative emphasis placed upon wool and lamb production. Production of meat is more directly influenced by quantity and quality of the forage than by any other single factor. Production of wool is influenced chiefly by breeding and to a lesser extent by climate, feed, and other factors. For this reason there is greater emphasis upon meat production in those parts of the Intermountain Region where forage is ample and high in quality. Where forage is scanty or poor a relatively greater emphasis is placed upon wool production.

Some breeds of sheep, such as Rambouillet and Merino (the foundation ewe stock for most of the western range sheep), produce high-quality wool but have comparatively small lambs. Other breeds, such as the Lincoln, Cotswold, and Down breeds, produce large

lambs. A common method of operation is to keep the wool-producing ewes and breed them to rams of the meat breeds (fig. 7). However, the crossing of meat and wool types raises a problem of producing replacement ewes. This is particularly true for the small operator. It is uneconomical for him to run one lot of sheep for the production of breeding ewes and another for the production of market lambs. Some large sheepmen operate on virtually a dual basis to produce replacement ewes of wool breeds and cross-bred lambs for market. Therefore, it is evident that the sheepman has two alternatives for maintaining the numbers of breeding herds—raising them or buying them from other producers.

FIGURE 7.—Market lambs produced by crossing Hampshire rams with Rambouillet ewes.

CATTLE VERSUS SHEEP ON THE RANGE

Forage requirements of sheep and cattle differ in some respects, but both may use a seasonal range at about the same time. This is mostly true of the spring-fall ranges. On summer ranges, cattle graze on the lower elevations while sheep use the higher reaches. Accordingly, the average summer-range use for cattle is longer than for sheep. Cattle spend from 4 to 5 months, and sheep from 2½ to 3½ months on public summer range. The length of the summer grazing season shows some variation between grazing districts and between national forests. A shorter summer use, especially for sheep, is customary in the high mountains of Colorado, Wyoming, and Idaho. A longer summer-grazing season is found in some of the lower mountains of Nevada, Oregon, and southern Utah.

On winter range, sheep have the advantage as to length of season. The average length of licensed grazing for sheep on grazing-district winter range is 5 to 6 months. But sheep may not spend 6 months on winter range every year owing to the many uncertainties in its use.

Few cattle spend the larger part of the winter on open range in the Intermountain Region, but they do obtain early winter and early spring use. Exception is noted for some areas in the southern part of the region where the short-grass range type is found and where cattle operations may approach yearlong grazing. Some areas, especially in Utah and Nevada, which are used as winter range for sheep, are also used by cattle for summer range where water is available.

The relationship of cattle and sheep use on Federal lands is shown in figure 8. Concentrations of both cattle and sheep use are found in and near mountains and national forests owing to the relatively high grazing capacity of these areas. Extreme concentration of cattle use is found in Nevada area 1 and especially on the Humboldt National Forest and adjacent Nevada Grazing District 1. High concentration of sheep use is found in western Wyoming on the Wyoming National Forest and adjacent grazing district. The general appearance of range-use distribution indicates that cattle use tends to concentrate around summer-range areas. Here the public-range use is in close proximity to the ranch base. Sheep use shows the same concentration around summer range, but is more widespread, being well distributed over most of the grazing areas, because of the use of winter range.

Distant movements between seasonal ranges are not characteristic of the cattle operation. The cattle are released on the open range and generally begin a gradual drift toward the summer range. Later they may be rounded up and driven there, but they are not herded in the sense that sheep are herded. It is evident that range cattle require far less attention than range sheep, but the herding type of husbandry enables the sheepman to expand his operations over more territory than the cattleman.

Herding of sheep makes possible a more uniform use of the range forage than if they were allowed to graze at will. Utilization of the range forage is more completely under the supervision of the operator than is the case when cattle are run on the range. Distribution of cattle is obtained by riding, fencing, salting, and water development, but much congregating is inevitable. Therefore, it is possible to obtain a more exact utilization of range forage with sheep, without overgrazing, than is possible with other types of livestock.

LANDOWNERSHIP—PROBLEMS AND RESPONSIBILITY

Evolution of Land Pattern

One of the principal problems facing the range-sheep operator is to get sufficient range at the proper season to round out his yearly operations. This problem, a difficult one by itself, may be complicated by the land pattern existing in the area.

The present landownership pattern within the Intermountain Region is extremely complex, with great intermingling of lands of various ownership classes. It is the result of the process of selective private appropriations of land in units smaller than were necessary for efficient operation. Homestead and other laws [6] permitted acquisition of land in fairly small blocks. To get enough land for an efficient livestock unit it was necessary for the livestock operator to

[6] It is not within the scope of this publication to discuss all of the land acts as applied to the western United States. Such discussions can be found in A History of Public Land Policies, by Benjamin Horace Hibbard, and elsewhere.

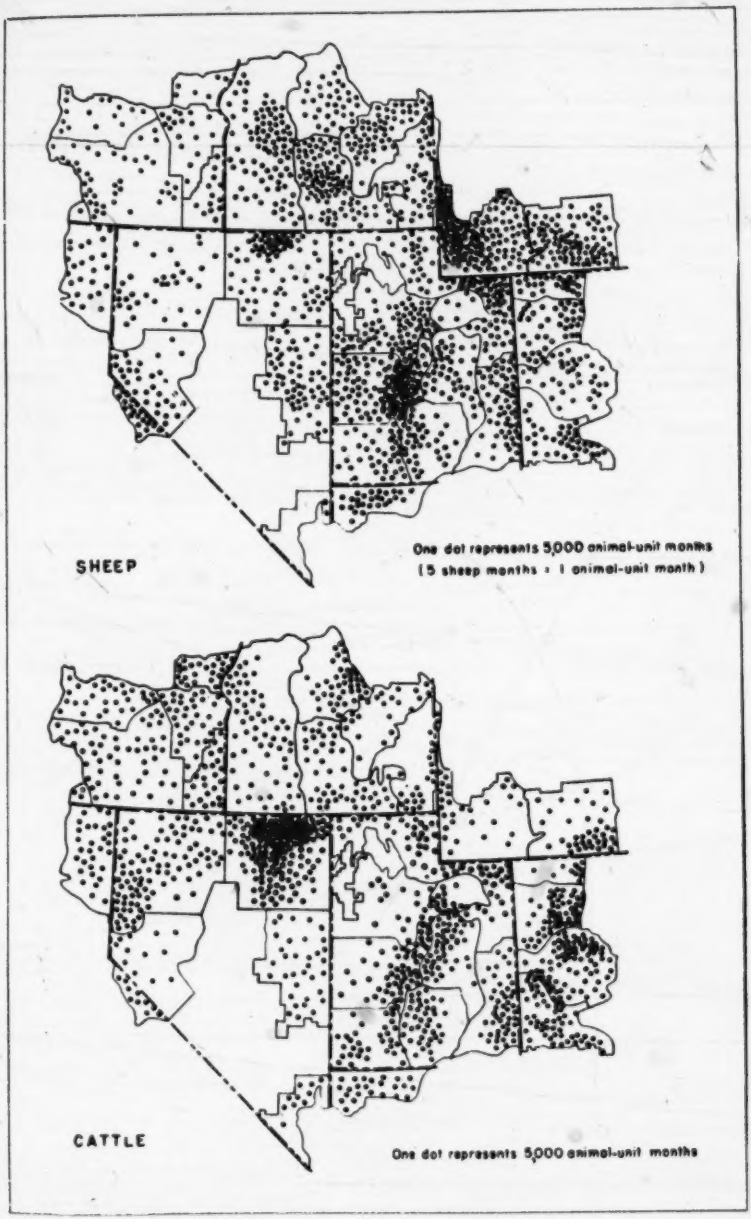
SHEEP
One dot represents 5,000 animal-unit months
(5 sheep months = 1 animal-unit month)
CATTLE
One dot represents 5,000 animal-unit months

FIGURE 8.—SHEEP AND CATTLE: ANIMAL-UNIT MONTHS OF PERMITTED AND LICENSED GRAZING ON FEDERAL LANDS, INTERMOUNTAIN REGION, 1938-39.

Several concentrations of sheep and cattle are apparent on these grazing lands.

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utilize extensive areas of public land or to buy or lease large tracts of private land.

Concurrently with the process of selective private appropriation, public lands have been reserved for various purposes. The Indian Reservations were set aside at fairly early dates, although they have been added to from time to time. Beginning in the last quarter of the nineteenth century, it was realized that much valuable Federal land was being exploited by private individuals with little regard for conservation and future land needs.

Creation of the national forests was one of the first outgrowths of a rising conservation movement. Most of the present western national forests were created in the period from 1900 to 1910, although substantial modifications have been made in many boundaries since then. National-forest areas have been created mostly in the higher mountain parts and the more rugged portions of the West. They were created for three primary reasons: (1) For the preservation and production of an adequate timber supply; (2) for watershed protection and control; and (3) for grazing protection management. The passage of the Taylor Grazing Act in 1934, and the later establishment of grazing districts, brought most of the remaining unreserved and unappropriated public domain under positive management.

Combinations of Land Control

Practically all range-sheep operators of the Intermountain Region utilize public range at least part of the year.[7] Of the 5,031 operators included in this study, approximately one-third use a combination of grazing districts, national forests, and privately owned lands (table 4). Approximately 40 percent of the operators use grazing districts and privately owned lands only, and about one-fourth use only national forests and privately owned lands. In a few cases other land combinations are utilized. The combinations of landownership or land control obtained by a particular operator depend upon available forage resources and their control.

Table 4.—*Number and percentage of sheep operators using different types of landownership and control, Intermountain Region, 1938–39*

Home area of sheep	Operators using [1]—								Total
	Grazing district, national forest, and patented lands [2]		Grazing district and patented lands [2]		National forest and patented lands [2]		Other land combinations [3]		
	Number	*Percent*	*Number*	*Percent*	*Number*	*Percent*	*Number*	*Percent*	*Number*
Arizona 1	6	30	10	50	0	0	4	20	20
California 2	16	28	29	51	11	19	1	2	57
California, other [4]	2	14	4	29	8	57	0	0	14
Colorado 1	42	34	60	48	22	18	0	0	124
Colorado 3	90	36	79	32	80	32	0	0	249

[1] These combinations of use for various operators may exist in one or several areas.

[2] Patented lands include private land and some State, county, and municipally owned lands.

[3] Includes Indian Reservation, National Monuments, unregulated public domain, and other combinations with or without grazing-district and national-forest use.

[4] The "other" designations include those operators classified outside the region studied, but obtaining some use within one or more of the areas designated.

[7] See section on Methods and Scope of Study for data on numbers of sheep included in this study in relation to total sheep numbers in the region.

TABLE 4.—*Number and percentage of sheep operators using different types of landownership and control, Intermountain Region, 1938–39*—Continued

Home area of sheep	Operators using—								Total
	Grazing district, national forest, and patented lands		Grazing district and patented lands		National forest and patented lands		Other land combinations		
	Number	*Percent*	*Number*	*Percent*	*Number*	*Percent*	*Number*	*Percent*	*Number*
Colorado 4	41	23	33	18	105	59	0	0	179
Colorado 6	11	24	26	58	8	18	0	0	45
Colorado, other [4]	9	53	2	12	6	35	0	0	17
Idaho 1	62	36	85	50	24	14	0	0	171
Idaho 2	141	24	420	71	28	5	0	0	589
Idaho 3	70	53	60	45	2	2	0	0	132
Idaho 4	57	40	79	56	5	4	0	0	141
Southeast Idaho	102	27	53	14	214	57	9	2	378
Nevada 1	20	30	15	23	14	21	17	26	66
Nevada 2	10	30	23	70	0	0	0	0	33
Nevada 3	38	57	20	30	7	10	2	3	67
Nevada 4	18	37	23	48	0	0	7	15	48
New Mexico [5]	9	24	4	10	25	66	0	0	38
Oregon 1	2	8	6	25	16	67	0	0	24
Oregon 2	36	38	48	51	10	11	0	0	94
Oregon 3	15	31	32	67	1	2	0	0	48
Oregon 4	0	0	26	100	0	0	0	0	26
Oregon 5	15	34	22	50	3	7	4	9	44
Oregon 6	19	63	6	20	5	17	0	0	30
Oregon, other [4]	1	2	0	0	49	98	0	0	50
Utah 1	57	34	71	42	41	24	0	0	169
Utah 2	103	38	105	39	62	23	1	0	271
Utah 3	312	37	140	17	388	46	0	0	840
Utah 4	57	28	88	43	45	22	15	7	205
Utah 5	61	43	38	27	35	25	7	5	141
Utah 6	23	50	14	30	9	20	0	0	46
Utah 7	51	36	65	47	23	16	1	1	140
Utah 8	38	37	45	44	15	15	4	4	102
Utah, Uinta Basin	16	41	4	10	11	28	8	21	39
Wyoming 3	38	35	59	55	11	10	0	0	108
Wyoming 4	76	28	144	52	49	18	6	2	275
Wyoming, other [4]	3	27	8	73	0	0	0	0	11
All areas	1,667	33	1,946	39	1,332	26	86	2	5,031

[4] The "other" designations include those operators classified outside the region studied, but obtaining some use within one or more of the areas designated.

[5] Includes only those New Mexico operators who are licensed or permitted on Federal lands in Colorado area 4.

The proportion of the total number of sheep operators using different land-control combinations illustrates the wide variation in types of landownership which are available to sheepmen in the various areas. The proportion of all sheepmen who utilize grazing districts, national forests, and patented land varies from none in Oregon area 4 to more than 50 percent in several other grazing areas (table 13). The proportion of those using only grazing districts and privately owned land varies from 0 to 100 percent; likewise, the percentage using national forests and patented land varies between very wide limits. Of all operators, approximately 70 percent use grazing districts and 50 percent national forests.

In each case, the sheepman has attempted to get the cheapest and most conveniently located range forage. The resulting land use combinations are due partly to landownership and land control within the area, and partly to the administrative regulations of the Grazing Service and the Forest Service regarding the use of grazing land under their respective jurisdictions.

Ownership and Responsibility

The preceding discussion of sheep operations, seasonal ranges, and possible land-control combinations indicates the problems of administration and management of the public range lands in the Intermountain Region. Because of its relationship to other areas which are in turn related to additional areas, consideration cannot be limited to one tract or type of range alone. When several types of range are in various ownerships or control, as is frequently the case, the objectives of the administrator of one type of range may be nullified by lack of cooperation on the part of the owner or administrator of other lands.

National-forest lands are managed under the principle of multiple use in which consideration must be given to watershed protection, recreation, wildlife, and timber production as well as grazing. On many national forests watershed protection takes precedence over all other uses. Such watershed areas are indispensable to farm and croplands as a source of irrigation water. It follows that the national-forest administrator may find it necessary at times to curtail grazing on certain areas to protect watershed values. This may seriously affect some sheep operators who have no immediate interest in water protection, because they use little or no hay. Nevertheless, grazing on national forests must be correlated with other important uses of these lands.

Public-land agencies control vast acreages of range in this region and are attempting to prevent range deterioration and erosion, but they exercise only indirect control over deterioration occurring on private lands. Indirect supervision is obtained on private lands that have public-land grazing privileges by the adoption of commensurability [8] devices. The establishment of commensurability standards, however, cannot correct all abusive practices on private ranges, nor approach the grazing standards applied to public lands.

Other types of supervision exercised by public agencies are the private-land permits of the Forest Service which allow an operator with private lands within or adjacent to a national forest to obtain national-forest use to advantage, in exchange for administration and control by the Forest Service over his private lands.

The Grazing Service is obtaining some semblance of administration over the large acreages of railroad checkerboard lands in some grazing districts, by obtaining agreements with the railroads. Rather than lease these alternate sections from year to year, the railroads allow the Grazing Service to administer them along with intermingled public lands and collect the grazing fees, returning a proportionate amount to the railroads. This is a significant advance in the administration of these lands.

Range in the national forests, administered by the Forest Service, is predominantly summer range. The Grazing Service controls large tracts of winter range and considerable spring-fall and summer range. This was unregulated public domain until recently. The greatest proportion of private ownership is found in the spring-fall range, which is often the scarce factor among the seasonal ranges. Serious depletion of these spring-fall ranges calls attention to their importance in yearly operation and to the need for planning for their protection.

[8] Commensurability is the relationship which exists between public and private lands. A ranch that is commensurate to graze livestock on public lands must have sufficient feed, forage, or grazing available to maintain its livestock during the time they are not on public lands. The extent of commensurability required of private land will determine the intensity of use by livestock on this land.

WHERE SHEEP MOVE IN THE INTERMOUNTAIN REGION

Interrelation Between Grazing Areas

Although the grazing districts, adjacent national forests, and privately owned lands, combined as grazing areas in this study, constitute geographical units in some instances, there is a high degree of interrelation between these areas (fig. 9). None, with the exception of Oregon area 6, which is somewhat isolated from other areas, has such a combination of range use that all seasonal grazing and forage requirements for the sheep of that area are satisfied.[9]

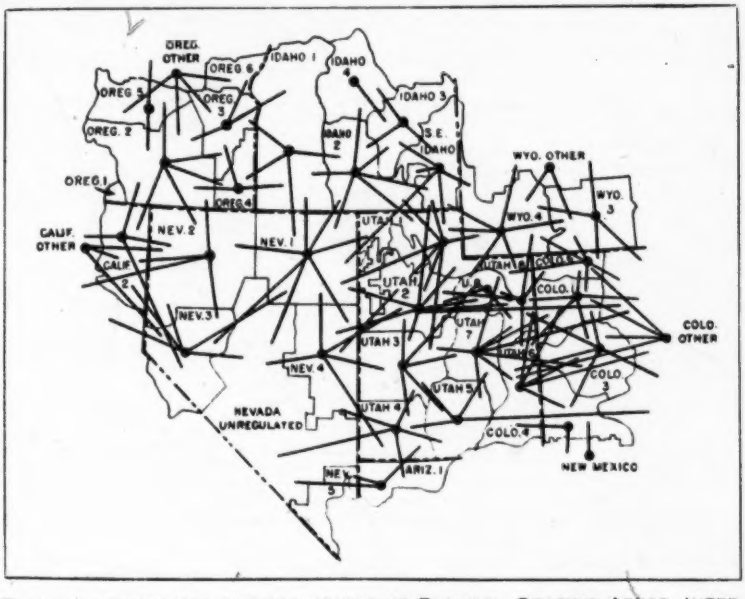

FIGURE 9.—SHEEP-USE INTERRELATIONSHIP BETWEEN GRAZING AREAS, INTERMOUNTAIN REGION, 1938-39.

Sheep movements indicate the complimentary nature of rangelands.

With limited control of the adjacent spring-fall ranges, the problem of land management for the public-range administrator becomes more involved. The Western Range Report says: "Depletion of the spring-fall ranges before summer ranges are ready for use has been the cause for one of the most difficult problems in grazing administration on national forests, because of the insistent pressure for grazing these

[9] When the terms "grazing" and "forage requirement" or "sheep-months grazing" and "forage" are used, a time basis only is implied. The sheep-months use obtained on public lands is grazing use (with the possible exception of small quantities of supplements fed during critical periods). The same terms applied to private lands may include, besides grazing, supplementary feeding of the animals, but are also used on a time basis only. The records taken from public agencies show the number of sheep and length of time they are permitted to graze on public lands. If one animal is permitted on public land for 8 months, then the use on patented land must be 4 sheep months. These 4 sheep months may be obtained from range forage, cultivated feed, or both. No effort was made to ascertain the quality or quantity of forage and feed, nor the supporting capacity of the range, although it is evident that ranges differ greatly.

public ranges prematurely."[10] The Forest Service may be urged to permit earlier use of the national-forest ranges than is consistent with good management, on the argument that this would relieve the pressure in spring-fall ranges. If the Forest Service were to heed such a plea, it would have no assurance that the use which would be made of spring-fall ranges would be any wiser than before. The situation has improved since the grazing districts were organized and since most of the previously unreserved and unappropriated public domain was brought under direct administration. Similar instances could be cited for the Grazing Service and, to a considerable extent, for private land operators.

Of the 4,901 operators who have their homes within the Intermountain Region (130 operators come into the region from outside), 76 percent use their home area exclusively (table 5). This may suggest that operations are predominantly local in character, but the average grazing area actually includes almost 6 million acres—larger than the entire State of Vermont. Only 24 percent of the operators use two or more grazing areas, but 50 percent of the total number of sheep use two or more (table 6). The larger operators are best able to use more distantly located ranges.

The purpose of sheep movements and the relationship of these movements to various grazing areas can be illustrated in two ways. The first is a study of the *sheep of a given grazing area*—other areas of use and the quantity of forage obtained from various ownership and control classes. The second is a study of the *forage of a given grazing area* by ownership and control classes—the amount obtained by sheep from other grazing areas and the other areas that are involved.

TABLE 5.—*Sheep operators of specified areas classified on basis of the number of grazing areas in which they operated, Intermountain Region, 1938–39* [1]

Home area of operators	Total operators classified in home area	Operators solely in home area	Operators obtaining use in the following number of additional areas			Total number of areas which operators use	Percentage of operators obtaining use outside home area
			One	Two	Three		
	Number	*Number*	*Number*	*Number*	*Number*	*Number*	*Percent*
Arizona 1	20	7	12	0	1	4	65
California 2	57	33	20	4	0	5	42
Colorado 1	124	91	27	6	0	6	27
Colorado 3	249	226	15	8	0	6	9
Colorado 4	179	162	17	0	0	3	9
Colorado 6	45	29	13	2	1	6	36
Idaho 1	171	151	17	3	0	5	12
Idaho 2	589	451	105	33	0	7	23
Idaho 3	132	98	34	0	0	4	26
Idaho 4	141	140	1	0	0	2	1
Southeast Idaho	378	179	186	11	2	6	53
Nevada 1	66	36	18	9	3	8	45
Nevada 2	33	18	12	3	0	3	45
Nevada 3	67	57	7	3	0	6	15
Nevada 4	48	28	19	1	0	6	42
Oregon 1	24	15	9	0	0	3	38
Oregon 2	94	82	12	0	0	6	13
Oregon 3	48	25	21	2	0	4	48
Oregon 4	26	10	15	1	0	4	62
Oregon 5	44	33	11	0	0	3	25
Oregon 6	30	30	0	0	0	1	0
Utah 1	169	111	53	4	1	8	34

[1] Includes only operators licensed or permitted to graze sheep on Federal lands, but does not include the Colorado, California, Oregon, and Wyoming "other" operators, and New Mexico operators.

[10] UNITED STATES FOREST SERVICE. THE WESTERN RANGE * * * 74th Cong., 2nd sess., S. Doc. 199, 620 pp. illus. 1936. See p. 403.

TABLE 5.—*Sheep operators of specified areas classified on basis of the number of grazing areas in which they operated, Intermountain Region, 1938–39*—Con.

Home area of operators	Total operators classified in home area	Operators solely in home area	Operators obtaining use in the following number of additional areas			Total number of areas which operators use	Percentage of operators obtaining use outside home area
			One	Two	Three		
	Number	*Number*	*Number*	*Number*	*Number*	*Number*	*Percent*
Utah 2	271	204	56	7	4	9	25
Utah 3	840	754	85	1	0	6	10
Utah 4	205	126	72	7	0	7	39
Utah 5	141	133	7	1	0	5	6
Utah 6	46	27	15	4	0	6	41
Utah 7	140	118	20	2	0	9	16
Utah 8	102	80	20	2	0	7	22
Utah, Uinta Basin	39	15	13	11	0	3	62
Wyoming 3	108	69	30	7	2	5	36
Wyoming 4	275	206	59	10	0	7	25
Total	4,901	3,744	1,001	142	14	.....	.....
Average	153	117	31	4	(2)	5.4	24

[2] Less than 1.

TABLE 6.—*Number of sheep owned by operators who obtain use from varying numbers of grazing areas, Intermountain Region, 1938–39*

Number of grazing areas used	Operators	Sheep per operator	Sheep owned [1]
	Number	*Number*	*Thousands*
1	3,744	896	3,325
2	1,001	2,318	2,394
3	142	5,128	738
4	14	10,697	150
Total	[3] 4,901	.....	[3] 6,607

[1] Includes total number of sheep owned by operators obtaining use from various numbers of grazing areas. Some operators may not take all their sheep into all the grazing areas used by the operation; therefore, the total number of sheep actually using 2 or more grazing areas would be slightly less than indicated.
[3] Does not include 130 operators from outside areas who come into the area covered by the study.

The relative proportions of grazing and forage furnished to sheep by their home area and by outside areas depends to some extent on the size of the area and upon how nearly it approaches being a natural land use area. The proportion of sheep-months use obtained within a grazing area by sheep classified as belonging to that area varies from only slightly more than 50 percent for the Uinta Basin area of Utah to 100 percent in the case of Oregon area 6 (tables 7 and 13). For most grazing areas, 75 to 90 percent of the sheep-months use required is obtained within the boundaries of the home area of the sheep.

The proportion of this use obtained from different land-control sources depends upon the extent and grazing capacity of the rangelands under different ownerships and control. The use secured from all patented land was 51 percent of the total annual sheep-months use required for the 6,750,000 sheep included in this study. Comparable figures are 12.3 percent from the national forests and 36.2 percent from the grazing districts. The use obtained from these 3 main sources varied greatly between grazing areas, as can be observed in tables 7 and 13.

Such areas as those in Idaho where the operators obtain approximately 50 percent of their sheep-months use on patented land, are

not directly comparable with one like Wyoming area 3, which has about the same percentage of sheep-months use on patented land. Forage from the patented lands of the Idaho area comes from irrigated pasture and cultivated feed, whereas most of the forage from patented lands of Wyoming area 3 is range forage from railroad checkerboard lands.

TABLE 7.—*Percentage distribution of annual sheep-months use obtained in all grazing areas by sheep classified in specified home grazing areas, Intermountain Region, 1938–39* [1]

Home area of sheep	Total operators classified in home area	Number of sheep	Annual sheep-months requirement	Sheep-months use obtained in home area				Sheep-months use obtained outside home area			
				Grazing district	National forest	Patented land	Total	Grazing district	National forest	Patented land	Total
	Number	*Thousands*	*Thousands*	*Percent*	*Percent*	*Percent*	*Percent*	*Percent*	*Percent*	*Percent*	*Percent*
Arizona 1	20	44	528	62.7	1.1	5.5	[2] 71.6	[3] 8.3	3.0	17.2	28.4
California 2	57	99	1,188	24.0	8.8	44.6	77.4	11.2	2.4	8.5	[2] 22.6
Colorado 1	124	179	2,143	25.4	10.1	51.8	87.3	7.1	3.1	2.5	12.7
Colorado 3	249	259	3,108	12.6	12.7	61.3	86.6	10.1	1.2	2.1	13.4
Colorado 4	179	180	2,154	11.1	19.0	63.0	93.1	5.4	0	1.5	6.9
Colorado 6	45	110	1,324	27.7	4.1	51.4	83.2	11.6	2.6	2.6	16.8
Idaho 1	171	456	5,474	18.4	16.0	61.6	96.0	1.3	1.5	1.2	4.0
Idaho 2	589	585	7,017	20.8	9.5	56.9	[4] 87.2	6.1	5.0	1.7	12.8
Idaho 3	132	134	1,603	27.3	13.2	44.2	84.7	3.5	2.4	9.4	15.3
Idaho 4	141	103	1,232	34.1	19.0	46.7	99.8	.1	0	.1	.2
Southeast Idaho	378	419	5,029	0	13.0	62.4	[2] 80.3	12.9	3.4	3.4	19.7
Nevada 1	66	285	3,425	28.0	15.8	26.7	70.5	[3] 21.0	.7	7.8	29.5
Nevada 2	33	103	1,235	41.6	4.2	39.1	84.9	6.1	1.2	7.8	15.1
Nevada 3	67	177	2,121	33.8	7.5	29.8	71.1	[3] 7.3	11.5	10.1	28.9
Nevada 4	48	124	1,490	69.0	8.1	12.0	89.1	[3] 3.5	.2	4.4	[4] 10.9
Oregon 1	24	30	360	5.0	8.6	75.6	89.2	0	10.8	0	10.8
Oregon 2	94	182	2,186	26.9	7.5	62.5	96.9	2.0	.0	1.1	3.1
Oregon 3	48	112	1,345	22.4	4.2	52.9	79.5	2.1	3.5	14.9	20.5
Oregon 4	26	46	554	47.7	0	33.0	80.7	4.5	0	14.8	19.3
Oregon 5	44	60	715	13.3	12.3	67.0	92.6	.8	.6	6.0	7.4
Oregon 6	30	47	559	8.2	18.3	73.5	100.0	0	0	0	0
Utah 1	169	264	3,164	11.4	6.8	61.0	79.2	18.3	1.1	1.4	20.8
Utah 2	271	380	4,561	24.2	9.3	47.5	81.0	13.9	2.0	2.9	[3] 19.0
Utah 3	840	349	4,185	41.2	14.2	38.5	93.9	2.7	2.3	1.1	6.1
Utah 4	205	240	2,882	18.6	5.5	44.7	68.8	[3] 26.8	.8	1.5	[2] 31.2
Utah 5	141	84	1,012	51.3	18.3	26.4	96.0	1.8	1.2	1.0	4.0
Utah 6	46	135	1,616	49.2	6.1	22.2	77.5	6.1	5.6	10.8	22.5
Utah 7	140	146	1,757	52.7	5.4	32.3	90.4	2.4	2.1	4.9	[3] 9.6
Utah 8	102	163	1,952	37.6	6.9	46.8	91.3	3.5	1.3	3.6	[2] 8.7
Utah, Uinta Basin	39	50	598	0	9.7	43.5	[2] 56.2	33.5	9.5	.8	43.8
Wyoming 3	108	432	5,425	34.6	4.3	52.4	91.3	2.7	4.5	1.5	8.7
Wyoming 4	275	612	7,346	40.5	3.8	45.6	89.9	1.6	5.4	3.1	10.1
All areas	4,901	6,609	79,288	28.8	9.5	46.3	[2] 84.9	[2] 7.5	2.8	4.7	[3] 15.1

[1] Does not include sheep classified in "other" areas. See table 13 for distribution of use by sheep-months, for all sheep included in study.

[2] Total includes use obtained on other Federal lands, such as Indian Reservations, National Monuments, etc.

[3] Includes grazing on Nevada unregulated public domain. Unregulated public domain is not included in established grazing districts but its use is subject to leasing arrangements from the Department of the Interior.

Turning from the source of forage for sheep classified in the various home areas, the opposite comparison is now made: In any given area, how much forage of that area is obtained by the sheep of that area; how much by outside sheep; and where do these outside sheep come from? For example, the forage furnished by Nevada area 1 is utilized by sheep of that area and by sheep from several adjoining areas.

The proportion of the total sheep-months use furnished in an area which is utilized by the sheep classified in that area varies from 0 in

Nevada area 5 to 100 percent in Oregon area 1. For most areas, the percentage of the total sheep-months use obtained by sheep classified in that area is 75 or more, and in approximately half of the areas it is 90 or more (table 8).

TABLE 8.—*Use of grazing and forage furnished by specified grazing areas to sheep classified in the area and to sheep from other areas, Intermountain Region 1938–39* [1]

Area	All operators obtaining forage in area	Total sheep-months use furnished by area	Sheep-months use obtained by sheep classified in area				Sheep-months use obtained by sheep classified in other areas			
			Grazing district	National forest	Patented land	Total	Grazing district	National forest	Patented land	Total
	Number	*Thousands*	*Percent*	*Percent*	*Percent*	*Percent*	*Percent*	*Percent*	*Percent*	*Percent*
Arizona 1	47	761	43.5	0.8	3.8	[2] 49.7	40.3	0	7.4	[2] 50.3
California 2	84	1,125	25.3	9.3	47.1	81.7	3.3	8.3	6.7	18.3
Colorado 1	147	2,107	25.8	10.3	52.7	88.8	6.5	1.7	3.0	11.2
Colorado 3	274	2,945	13.3	13.5	64.6	91.4	1.6	3.6	3.4	8.6
Colorado 4	233	2,372	10.1	17.2	57.3	84.6	4.0	7.5	3.9	15.4
Colorado 6	73	1,268	29.0	4.3	53.6	86.9	6.4	3.5	3.2	13.1
Idaho 1	265	5,773	17.4	15.1	58.5	91.0	4.2	1.0	3.8	9.0
Idaho 2	649	6,385	22.8	10.4	62.6	95.8	1.3	1.7	1.2	4.2
Idaho 3	319	2,151	20.3	9.8	33.0	63.1	26.5	4.4	6.0	36.9
Idaho 4	171	1,472	28.6	15.9	39.1	83.6	3.6	11.6	1.2	16.4
Southeast Idaho	432	4,358	0	15.0	72.0	[2] 92.7	0	4.2	3.1	7.3
Nevada 1	113	3,055	31.5	17.7	29.9	79.1	12.8	6.2	1.9	20.9
Nevada 2	61	1,544	33.2	3.4	31.3	67.9	16.5	0	15.2	[2] 32.1
Nevada 3	80	2,020	39.4	17.4	37.5	94.3	4.5	.3	.9	5.7
Nevada 4	83	1,932	53.2	6.2	9.3	68.7	29.0	0	2.3	31.3
Nevada 5	5	42	0	0	0	[3] 0	100.0	0	0	[100] 0
Oregon 1	24	321	5.6	0.7	84.7	100.0	0	0	0	0
Oregon 2	116	2,282	25.8	7.2	59.9	92.9	1.2	1.5	4.4	7.1
Oregon 3	71	1,189	25.4	4.7	59.8	89.9	3.5	3.1	3.5	10.1
Oregon 4	34	517	51.1	0	35.4	86.5	8.5	0	5.0	13.5
Oregon 5	83	875	10.8	10.1	54.8	75.7	1.1	22.4	.8	24.3
Oregon 6	35	582	7.9	17.5	70.6	96.0	.6	1.7	1.7	4.0
Utah 1	219	2,942	12.2	7.3	65.6	85.1	3.4	1.5	10.0	14.9
Utah 2	363	4,402	25.0	9.6	49.3	83.9	10.7	2.5	2.9	16.1
Utah 3	945	4,675	36.9	12.6	34.5	84.0	14.3	.8	.9	16.0
Utah 4	228	2,179	24.5	7.3	59.2	91.0	2.0	1.4	5.6	9.0
Utah 5	170	1,053	49.3	17.7	25.3	92.3	2.8	4.7	.2	7.7
Utah 6	87	1,771	44.8	5.6	20.3	70.7	25.9	0	3.4	29.3
Utah 7	146	1,600	57.9	5.8	35.5	99.2	.4	.4	0	.8
Utah 8	159	2,276	32.3	5.9	40.1	78.3	16.9	1.8	3.0	21.7
Utah, Uinta Basin	54	368	0	15.8	70.6	[2] 91.3	0	3.5	0	[2] 8.7
Wyoming 3	135	5,226	35.9	4.4	54.4	94.7	2.6	.5	2.2	5.3
Wyoming 4	309	6,827	43.6	4.1	49.1	96.8	2.6	.1	.5	3.2
All areas		78,395	26.7	9.4	46.1	[2] 82.7	10.8	3.0	3.2	[2] 17.3

[1] See table 14 for distribution of use by sheep-months.
[2] Total includes use obtained on other Federal lands such as Indian Reservations, National Monuments, etc.
[3] No operators were classified as having Nevada area 5 as their home area.

Data given in tables 7 and 8 are a further illustration of the interrelationships of sheep ranges over broad areas. Major shifts in the use of range in almost any part of the Intermountain Region would involve some repercussions upon the use of range in several other parts. If the sheep that move from southeastern Idaho into Nevada area 1 were to cease doing so because of the long and hazardous trailing involved, some winter range would then be available for sheep of the latter area. In turn this would permit changes in use for range sheep of Nevada area 4, and might conceivably involve some changes for sheep grazed in Utah area 4, from which they now migrate to southern Nevada for winter range.

Grazing and Forage Balance

Interesting comparisons can be made between the total sheep-months forage obtained by all sheep in an area, whatever their origin, and the total requirement for the sheep classified in that area.[11] The sheep classified in Arizona area 1 require 528,000 sheep-months use annually; whereas this area furnishes 761,000 sheep-months use (table 9).

TABLE 9.—*Balance between sheep-months use furnished by grazing areas and total sheep-months use obtained by sheep classified in the areas, Intermountain Region, 1938–39*

Grazing area	Sheep-months use obtained by sheep classified in area				Sheep-months use furnished by area				Sheep-months use furnished in excess of total requirement for sheep of area[1]			
	Grazing district	National forest	Patented land	Total	Grazing district	National forest	Patented land	Total	Grazing district	National forest	Patented land	Total
	Thousands	*Thousands*	*Thousands*	*Thousands*	*Thousands*	*Thousands*	*Thousands*	*Thousands*	*Thousands*	*Thousands*	*Thousands*	*Thousands*
Arizona 1	368	22	120	[2] 528	638	6	44	[2] 761	270	−16	−76	233
California 2	418	132	631	[2] 1,188	322	198	605	1,125	−96	66	−26	−63
Colorado 1	695	283	1,165	2,143	681	252	1,173	2,107	−14	−31	9	−36
Colorado 3	706	434	1,868	3,108	440	501	2,004	2,945	−266	67	36	−163
Colorado 4	355	409	1,390	[2] 2,154	334	588	1,450	2,372	−21	179	70	218
Colorado 6	319	90	715	1,324	449	99	720	1,268	−70	9	3	−56
Idaho 1	1,078	958	3,438	5,474	1,249	933	3,591	5,773	171	−25	153	299
Idaho 2	1,888	1,015	4,114	7,017	1,538	778	4,069	6,385	−350	−237	−45	−632
Idaho 3	405	250	860	1,603	1,007	306	838	2,151	514	56	−22	548
Idaho 4	422	234	576	1,232	474	403	593	1,472	52	171	17	240
Southeast Idaho	650	824	3,308	[2] 5,029	0	835	3,276	[2] 4,358	−650	11	−32	−671
Nevada 1	1,441	556	1,111	[2] 3,425	1,353	728	974	3,055	−88	172	−137	−370
Nevada 2	568	67	580	1,235	768	52	717	[2] 1,544	180	−15	137	309
Nevada 3	818	401	848	[2] 2,121	886	357	777	2,020	68	−44	−71	−101
Nevada 4	1,080	123	245	[2] 1,490	1,580	120	223	1,932	500	−3	−22	442
Nevada 5	0	0	0	0	42	0	0	42	42	0	0	42
Oregon 1	18	70	272	360	18	31	272	321	0	−39	0	−39
Oregon 2	632	165	1,389	2,186	617	199	1,466	2,282	−15	34	77	96
Oregon 3	331	103	911	1,345	343	93	753	1,189	12	−10	−158	−156
Oregon 4	289	0	265	554	308	0	209	517	19	0	−56	−37
Oregon 5	101	92	522	715	105	284	486	875	4	192	−36	160
Oregon 6	46	102	411	559	49	112	421	582	3	10	10	23
Utah 1	989	252	1,973	3,164	460	259	2,223	2,942	−479	7	250	−222
Utah 2	1,738	511	2,302	[2] 4,561	1,574	531	2,297	4,402	−164	20	−5	−159
Utah 3	1,837	689	1,659	4,185	2,390	631	1,654	4,675	553	−58	−5	490
Utah 4	1,235	183	1,331	[2] 2,882	578	190	1,411	2,179	−657	7	80	−703
Utah 5	537	198	277	1,012	548	236	269	1,053	11	38	−8	41
Utah 6	893	189	534	1,616	1,252	99	420	1,771	359	−90	−114	155
Utah 7	969	131	654	[2] 1,757	932	100	568	1,600	−37	−31	−86	−157
Utah 8	804	159	983	[2] 1,932	1,120	174	982	2,276	316	15	−1	324
Uinta Basin	200	115	265	[2] 598	0	71	200	[2] 368	−200	−44	−5	−230
Wyoming 3	2,026	473	2,926	5,425	2,013	235	2,958	5,226	−13	−218	32	−199
Wyoming 4	3,090	679	3,577	7,346	3,148	290	3,389	6,827	58	−389	−188	−519
Total	27,204	9,909	41,310	[3] 79,288	27,225	9,713	41,093	[3] 78,395	21	−196	−217	−893

[1] A minus sign indicates that less sheep-months use was furnished by the area than was necessary to fulfill the annual sheep-months requirement of sheep classified in the area.

[2] Total includes use obtained from other Federal lands such as Indian Reservations, National Monuments, and unregulated public domain.

[3] Total includes use obtained in New Mexico, the distribution of which was not determined.

In other words, the sheep classified in this area require only 69 percent of the total sheep-months use furnished by that area, but these sheep actually obtain only 50 percent of this use. The other 50

[11] The total sheep-months use available to sheep in an area was calculated by adding the sheep-months of use obtained by sheep classified in the area to that obtained by outside sheep coming into the area. This may not necessarily be all of the forage available for sheep. However, most of the western ranges are considered to be at least fully stocked, so any enlargement of the figure would come from croplands in the form of increased feeding of hay and other feeds.

percent is obtained by sheep classified in Utah area 4. The remaining sheep-months use for sheep classified in Arizona area 1 is obtained from Utah area 4, from Nevada area 5, and from unregulated public domain lands in Nevada. Arizona area 1 contains predominantly one seasonal range, so that sheepmen must use lands outside. Arizona area 1 may be described as a political unit and not as a natural land use area. Its boundaries have been partially determined by the Utah-Arizona and Nevada-Arizona boundary lines. These lines are not natural boundary lines, either topographically or from a range-use standpoint.

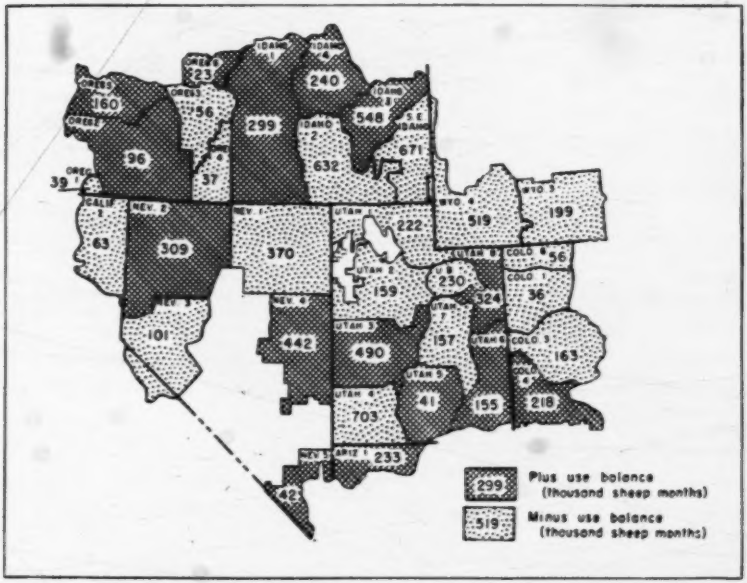

FIGURE 10.—SHEEP-MONTHS USE BALANCE BY GRAZING AREAS, INTERMOUNTAIN REGION, 1938-39.

Fifteen areas furnish more sheep-months use than is needed by their home sheep.

A comparison of the grazing areas discloses that 15 have a plus sheep-months use balance (that is, each furnishes more sheep-months use than is necessary for sheep classified in the area), and 18 a minus balance (fig. 10). Idaho area 3 has the highest plus sheep-months use balance (548,000 sheep-months). This is because many sheep-operators living in southeastern Idaho, and Idaho area 2, use this area for their spring-fall range and for some summer range. The relationship between Idaho area 3, southeastern Idaho, and the southeastern part of Idaho area 2 is very close. One area furnishes the spring-fall range from the grazing district; the other areas furnish summer range from national forest and private lands, and winter feed and pasture from the private lands. The operations are not widespread, but the operator must deal with several grazing districts and national forests.

Utah area 4 has the greatest minus sheep-months use balance (703,000 sheep months). In other words, if all of the sheep classified in this area could stay there all the year and no sheep from other areas came in, the area would lack 703,000 sheep-months of fulfilling the yearly requirements of its home sheep. This area has much high-quality summer range on national forests and patented lands. The winter range is greater in acreage, but has exceedingly low grazing capacity. Accordingly, the operators migrate extensively outside to obtain winter forage. Both areas of Wyoming have a minus balance; they are mostly winter range, and to get summer range necessitates migration southward to Colorado and Utah, and northward to national forests in Wyoming.

Major Seasonal Movements of Sheep

DEVELOPMENT OF SEASONAL MIGRATIONS

The early sheep industry of this region was nomadic in character. Large areas of irrigated land had not been developed. The small quantity of hay, mainly native grass hay, was fed to cattle and horses. Winter feeding of sheep was not a common practice, as the animals could be wintered on free range. Accordingly, many outfits were on the range yearlong and, having no base, were constantly grazing between seasonal ranges. As the sheep population increased, greater demands were made for range. Sheep that reached a range first were likely to get most of the forage. This competiton for grazing resulted in increased movements, as roving bands of sheep were constantly seeking to get range where the forage had not already been removed.

Early migrations for feed were probably not so great in magnitude as those that followed. Only when pressure for range became severe did movement to greater distances ensue. The pressure for range and the poor quality of forage, and the need for water caused many sheep operators to obtain feed bases for at least partial winter feeding. This has reduced migration and lessened the dependence upon winter ranges for extended periods. The physical distances between seasonal ranges cannot be reduced. However, the constant movements of nomadic bands searching for forage have now been greatly reduced.

The development of the concept of commensurate property as a basis for the privilege of grazing on Federal lands has also reduced migration. The necessity for having a certain "base" of land, or in some cases water rights, plus prior use of a range area, virtually forces the operator to develop a more stabilized operation. Nevertheless, many operators not so fortunate in obtaining alternate winter feed or believing that the forage is worth the hazards involved, still migrate considerable distances to the winter ranges.

Major seasonal movements of sheep are directly associated with topographical and climatic features. Then man has imposed certain institutional patterns, such as location of villages and highways, and the distribution of landownership. All of these have influential bearing on the use of ranges by sheep.

The volume of sheep that move over the trails usually is determined by the relative grazing capacity of the complementary ranges. This statement is not wholly true because of the patterns of range use that have become established. Sheep may be trailed out of an area to

obtain one type of range, passing bands which are coming in to obtain the same type of range. This movement expands the volume of sheep trailing beyond that required to utilize the range most effectively.

Topography offers more of a barrier to summer range than to winter range, owing to elevation and ruggedness of the mountains which support most of the summer range. In most cases, the logical entrance to and exit from these rugged territories is through the natural drainageways. In these drainage lands man has also located roads, improvements, houses, and sometimes villages. Mass migration of thousands of sheep through these ways twice each year causes considerable conflict of use. The sheep trails approaching the winter range do not greatly interfere with the general public, as settlement is sparse. Here the topography consists of hills, mountains, and plateaus; and the rugged terrain that must often be traversed is not so rough as that of the summer range.

Movements of sheep over the range to obtain the annual forage supply may consist of two types—grazing movements and trailing movements. A migration may consist of (1) grazing through a seasonal range on a predetermined route of travel with a not too rigid time limitation; and (2) a direct trailing movement with a time limitation, and with very little grazing taking place along the trail. Grazing movements are exemplified by the movements in parts of Idaho and Wyoming, and trailing movements are well represented by the situation in western Utah, and in Nevada. *See folded map accompanying this publication for sheep-migration routes and the volume of sheep moving over various trails in the Intermountain Region.*

MIGRATION AREAS

The Intermountain Region may be divided into several generalized sheep-migration areas (fig. 11). These areas may be delineated on the basis of certain similarities of sheep operations. Differentiation between areas results from the adaptation of operations to topography, forage types, seasonal ranges, irrigated lands, land pattern, etc. Although these migration areas more nearly approach a balanced range use than do the grazing areas, they overlap to some extent. Not all operators within a migration area follow exactly the same pattern, so the yearly movement and operation for the majority of sheep operators in a migration area need to be considered.

(1) Migrations from the Central Rocky Mountains Westward.—Sheep operators of this generalized area summer their sheep on the national forests, adjacent private lands, and some grazing-district lands, all lying along the western slope of the Rocky Mountains in western Colorado. The large mass of winter range which is used as a complement to the summer range lies in western Colorado and eastern Utah, often at distances of 150 to 300 miles. Some winter range is found in the valleys of the Colorado River drainage area, adjacent to the mountains, but it is limited in extent. The spring-fall range lies along the mountains and in the valleys of the Colorado River drainage. The extent of this type of range available to the sheep operators is limited and must be shared with many cattle. Some tracts of land lying near the mountains and along the Colorado River are now being irrigated for the production of forage

crops. Many of the smaller operators feed their sheep in the winter, but the large operators depend upon range.

Topography, together with available range in this area, results in a near-balanced distribution of forage for sheep. Undesirable aspects are the distances that separate summer from winter range and the low capacity of the latter as compared with the former. Past increases in cultivated forage have been used mainly by cattle and have not greatly reduced the numbers of sheep that migrate to the Utah-Colorado winter range.

Two major and several smaller migration routes are traversed by sheep in this area. Along the northernmost large route travel almost 100,000 sheep which summer on the high ranges of the Routt and

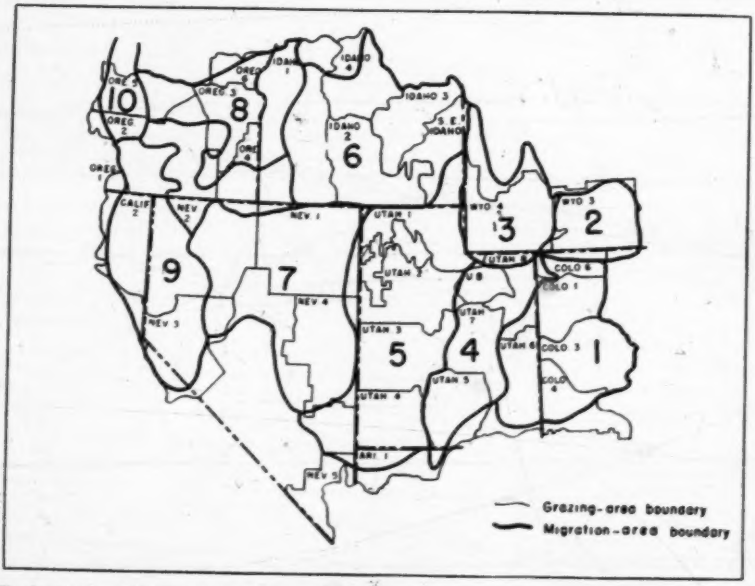

FIGURE 11.—GENERALIZED SHEEP-MIGRATION AREAS OF THE INTERMOUNTAIN REGION.

Areas are differentiated by fitting operations to range resources.

White River National Forests and adjacent private range lands. The winter range for these sheep lies chiefly in semidesert ranges of western Moffat and Rio Blanco Counties, Colo. One branch of this route, accommodating nearly 40,000 sheep, goes into the high mountain summer ranges south of the Yampa River. The remaining branches go into areas east of Craig, Colo., and north of the Yampa River.

Many operators have acquired land along this route for stopping places, and in some cases for lambing and shearing grounds. Problems of trespass are frequent and serious. In general, water is available along the way.

The second major route is followed by sheep moving to winter range from the high-mountain summer range adjacent to Steamboat

Springs and east of Montrose and Delta. They move down the Colorado River and the Gunnison River respectively. A large part of these sheep are moved at least one way by railway. The volume of rail movement in any given year depends chiefly on forage conditions and the condition of the animals. If the ewes are in poor condition when they come off winter range, they may be shipped part or all of the way to spring range and lambing grounds. Likewise, in the fall the ewes may be shipped out of the mountains where trailing is difficult, to be unloaded and trailed the remainder of the route to winter range. As increased settlement and motor travel have made these trails more difficult to travel, the rail and truck shipments of breeding animals will probably continue to increase.

Numerous smaller migration routes are found. The principal one connects the summer ranges of the San Juan and Montezuma National Forests of southeastern Colorado with winter range in San Miguel County, Colo., and San Juan County, Utah. Some New Mexico operators also use the summer range of southern Colorado.

(2) MIGRATIONS FROM NORTH CENTRAL ROCKY MOUNTAINS NORTHWARD TO THE WYOMING BASIN.—Summer range of this area is mostly in the Routt and Medicine Bow National Forests of Colorado and Wyoming. Winter range lies in the Wyoming Basin and includes a part of the Red Desert, and is mostly in grazing districts. In the mountain areas topography forces considerable concentration upon the trails. In the foothills and winter-range areas natural conditions do not limit the movement so closely, and there are numerous parallel movements. The original line of the railroad and its land-grant area, lie within the winter range. Alternate sections of these lands were given to the railroad and remain largely in railroad-company ownership. This checkerboard pattern of ownership has given the railroad a high degree of control of the intervening sections, so that sheepmen must own or lease some railroad lands, or be excluded from the area. Because of this control over winter range, it is frequently declared that winter ranges here are in better physical condition than in other parts of the West.

Some feeding of sheep is done along the base of the mountains, but most of the cultivated forage is fed to cattle. Generally the sheep obtain 10 months or more of use from range land, most of which is in public ownership.

(3) MIGRATIONS FROM THE WESTERN WYOMING MOUNTAINS SOUTH AND EAST TO THE WYOMING BASIN.—Summer range for this area is found in the Wyoming and Teton National Forests, and in Wyoming Grazing District 4 and private lands along the Wyoming-Utah State line. Some of the sheep also summer on the Ashley National Forest of Utah. Trails in the mountains carry large concentrations of sheep, but the mountains break off sharply into the winter range where the sheep trails rapidly fan out to merge into grazing movements.

Little or no cultivated forage is fed to sheep in this area. The type of operation is essentially yearlong range use, in which private lands are used in conjunction with public lands on the spring-fall and winter range. Most of the sheep spend 6 months, and some as much as 95 percent, of their time on public range.

(4) MIGRATIONS FROM THE UINTA AND WASATCH MOUNTAINS TO EASTERN UTAH.—This area overlaps to some extent two other migration areas. The summer range in the Uinta and Wasatch Mountains of Utah is also used by sheep that winter in western Utah. The winter range overlaps the winter range of sheep that summer in Colorado. Four general migration routes are discernible. Two are in the northern part of the area, from the Uinta and Ashley National Forests, and lead southward to winter range. This area encompasses much of the Uinta Basin. The larger operators usually are on range throughout the year. The smaller operators use summer range, and graze the winter range, as much as possible, adjacent to their ranches. This enables them to supplement the meager range with hay when necessary.

The two southern migration routes, although not of great magnitude, offer problems of land use. The distinguishing characteristic of the trails is the small number of sheep using them as contrasted with those of the areas to the west, east, and north. Although the length of these trails is not extreme, they are moderately long, particularly when compared with the small volume of movement over them. This area has very low grazing capacity, the rainfall is low, and a large part is barren or supports scant vegetation. Stock-water facilities along these routes are poor, or at best only fair. On the northernmost routes considerable privately owned range land occurs along the upper end of each trail, creating problems of trespass. The southern two-thirds of this area has little patented range land, and problems of trespass are less common. Much conflict of use exists between livestock and game animals on the spring-fall and winter ranges near the mountains. This overpopulation has caused serious depletion of forage, and has forced sheep to migrate farther from the mountains to obtain winter grazing.

(5) MIGRATIONS WESTWARD FROM MOUNTAINS OF UTAH AND SOUTHEASTERN IDAHO.—The summer range for this area is located in the Caribou, Targhee, and Cache National Forests of southeastern Idaho and in the various national forests and adjacent private lands of the Wasatch Plateau in Utah. The sheep winter in western Utah and parts of eastern Nevada. The spring-fall range lies in a narrow belt along the mountains and in the valleys of Utah, and of southeastern Idaho.

Six major movements and numerous smaller or branch movements are found in the area. The northernmost migration route is formed by two branches, one from the summer ranges of southeastern Idaho, the other from summer ranges in northern Utah. These join at Kelton, Utah, north of Great Salt Lake. Most of the sheep traveling this route go to northeastern Nevada for winter range, comparatively few using winter range of western Utah. The movements are of extreme length, sometimes in excess of 300 miles, and are highly hazardous. From Kelton, Utah, to Wendover the trail traverses an almost barren stretch where practically no forage can be obtained by the migrating sheep. Erosion has progressed rapidly, and gullying is made possible by even the slightest disturbance of vegetal cover on gentle slopes. In northern Utah, sheep traveling this trail trespass on grain fields and other farm lands.

Four significant movements stand out on the Utah section of the migration map. At the points of greatest concentration these migra-

tion routes all carry in excess of 100,000 sheep moving out of and back to winter range each year. The largest of these trails carries approximately 154,000 sheep. These movements are similar in length, direction, and problems arising from trespass on farm lands, and lack of watering and feeding facilities. The northernmost of the four is distinguished by rail shipment of almost half of the total volume between summer range east of Ogden, Utah, and winter range west of Salt Lake City. Large permanent shearing plants are found along some of the migration routes; the largest, at Jerico, Utah, shears 75,000 or more sheep annually.

In this region another major movement is found, extending from the summer range east of Cedar City, Utah, to winter range in Iron and Beaver Counties, Utah, and Lincoln County, Nev.

Several smaller movements extend from the same general summer range on the Dixie and Powell National Forests east of Cedar City, southward to winter range in southern Washington and Kanab Counties, Utah, into Arizona and Nevada.

FIGURE 12.—A sheep trail on the Utah West Desert. The vegetation has been destroyed on the trail and a definite "sheep line" can be seen on the trees.

Movements in this migration area constitute some of the largest and most closely spaced seasonal migrations of sheep in the western United States. In practically every instance the route followed is dictated by such natural factors as topography, mountain ranges, and lakes. The concentration of sheep on the trails is generally great (fig. 12). Most of these trails have only moderate or poor sources of water in the desert and semidesert areas. They traverse considerable privately owned range and farm lands before entering the mountain areas. In several instances sheep are forced to follow roads and even main highways.

In the mountain areas the routes are determined largely by topographic conditions, each major movement following the course of some stream. Usually major highways follow the same routes. Sheep have sometimes been fenced off the main highways into parallel trails; this has solved the problem so far as the motorists are concerned.

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These large concentrations of animals along the trail have resulted in denudation of ground cover and critical erosion conditions. Problems resulting from sheep trailing, discussed in more detail later, are probably more serious in central-western Utah than in any other part of the western United States.

Only a small number of Utah range sheep are wintered on hay. If any large reduction were made in the use of winter range, the hay supplies of this area would not be sufficient to feed these sheep. An unpublished analysis by the Intermountain Forest and Range Experiment Station indicates that about one-fourth of the present total hay production of the entire State of Utah would be required to replace a one-third reduction in use on western Utah winter sheep range.

(6) MIGRATIONS FROM THE SNAKE RIVER PLAINS OF IDAHO INTO THE SURROUNDING MOUNTAINS.—This area of Idaho contains a type of operation differing in some respects from operations in other migration areas of the Intermountain Region. Summer range for the sheep operators based along the Snake River and its tributaries lies to the north, east, and south. Operators north of the Snake River in the Bliss-Gooding-Shoshone-Jerome-Rupert-Wood-River irrigated areas generally go north to summer range. Operators south of the river in the Rupert-Burley-Twinfalls-Buhl areas go south for summer range—some as far south as the Humboldt National Forest of Nevada.

Operators in the Bliss-Shoshone-Gooding area move north in a combination grazing-trailing movement to summer range on the Sawtooth and Challis National Forests (fig. 13). South of Hailey this movement combines with other sheep movements from the Snake River Valley, and extends along the highway to the national forests. This trail, carrying 80,000 ewes with their lambs, has the largest volume of any in Idaho. It is estimated that in the past 200,000 sheep moved along this trail each year. This trailing greatly interferes with the settlers in the Big Wood River Valley and with motor traffic on the highways. Moreover, a well-known recreational center, called Sun Valley, has developed here.

Another major movement within the area consists of sheep moving out of the Snake River feed areas and grazing north to Muldoon and the Sawtooth National Forest. This movement is controlled to a large extent by the distribution of water, and in some places water must be hauled to the sheep on the trail. It developed as a grazing movement because of extensive areas of cheat grass (*Bromus tectorum*) which must be utilized by sheep in the early spring on their way to summer range. Two large permanent shearing plants are located along this route—the largest at Kinama, shears approximately 40,000 sheep a year.

Operators along the Snake River between Minidoka and St. Anthony go north or west for summer range. Much of the movement over Grazing Service land in this area for spring use is grazing, and actual trailing is confined to valleys to the north or in the vicinity of private land. The Grazing Service has established no trails in this area, but large numbers of sheep travel in directional grazing movements.

Sheep going from the Twin Falls-Rupert area to the spring range north of American Falls must cross north of Minidoka to avoid a lava flow which restricts east-west movement. Many must travel along highways or through fenced lanes until they reach the spring range.

Natural water is lacking on grazing movements north of the Snake River. Operators must haul water or get it from the railroad at the junction of their movement to the railroad right-of-way. Proceeding north in the spring, sheep usually graze a month or two before going

FIGURE 13.—Sheep trailing from summer range on Sawtooth National Forest, Idaho, to their winter feed bases along the Snake River.

to summer range; but because of lack of feed and water in the fall, they are forced to trail rapidly through on their return.

One large trail, carrying more than 60,000 sheep, extends east from the Snake River in the Blackfoot-American Falls area, across the Fort

Hall Indian Reservation to Soda Springs. If the weather is dry, the sheep trail along the highway because the distance can be covered more rapidly. From Soda Springs the trail continues to the Caribou and Targhee National Forests.

Trailing problems—such as provision for stock water, trespass on privately owned lands, depletion of the forage cover, and soil erosion—are all moderately serious along these trails. Emerging from the larger foothills, trails cease to be narrowly restricted and the sheep spread out widely. Upon entering the irrigated farming areas where sheep are fed through the winter, serious trail problems again arise, largely regarding trespass and congestion on roads and highways. Numerous undefined movements of sheep take place in the vicinity of these irrigated areas. The extremely seasonal character of the forage available on the surrounding tracts and the wide fluctuation of annual volume of this forage result in variation in operations from year to year.

(7) Migrations Within the Great Basin Area of Nevada.—Within the Great Basin Area of Nevada there are a number of more or less well-defined seasonal migrations of sheep. The main part of the summer range is within, or adjacent to, national forests, particularly the Humboldt National Forest (fig. 14). None of these trail movements approaches in size the large seasonal migrations of Utah, Colorado, and Wyoming. The maximum movement includes approximately 60,000 ewes.

The prevailing north-south axis of the mountains forces a parallel movement of range sheep, and the fairly narrow valleys between the mountains necessitate concentration of animals along the trail. One major trail leads from the Humboldt Division of the Humboldt National Forest southward, across the Ruby Mountains, thence southward into southern Elko and northern White Pine Counties. Another major trail originates in approximately the same area and goes southward into winter areas in White Pine and Nye Counties. Other grazing and trail movements lead out from the same summer range and far away to the west for winter range in Pershing, Churchill, and Lander Counties; these trails do not have large volumes of sheep, because, as in eastern Utah, the grazing capacity of the range lands is relatively low. Many of the Nevada movements are extremely long, partly because much of the more desirable winter range lies at a far distance.

Although intervening areas can be, and sometimes are, used for winter range, they are hazardous because of heavy snowfall. In some years storms bring considerable losses among the sheep, and lack of livestock water is serious. Infrequent stock-water facilities have resulted in serious forage depletion around watering places. Forage depletion and soil erosion along the trails are not yet so serious as in western Utah and other places, because the number of sheep involved has not been so great.

Forage depletion and soil erosion are more local in character; that is, they occur in the valleys along the sheep trails and in tracts near the entrance to winter range. Here the sheep bunch up, awaiting adequate snow before entering winter-range areas. In dry winters, heavy concentrations of sheep may gather for a month or more around watering places and ranches that have hay for sale, causing damage to the range before moving southward.

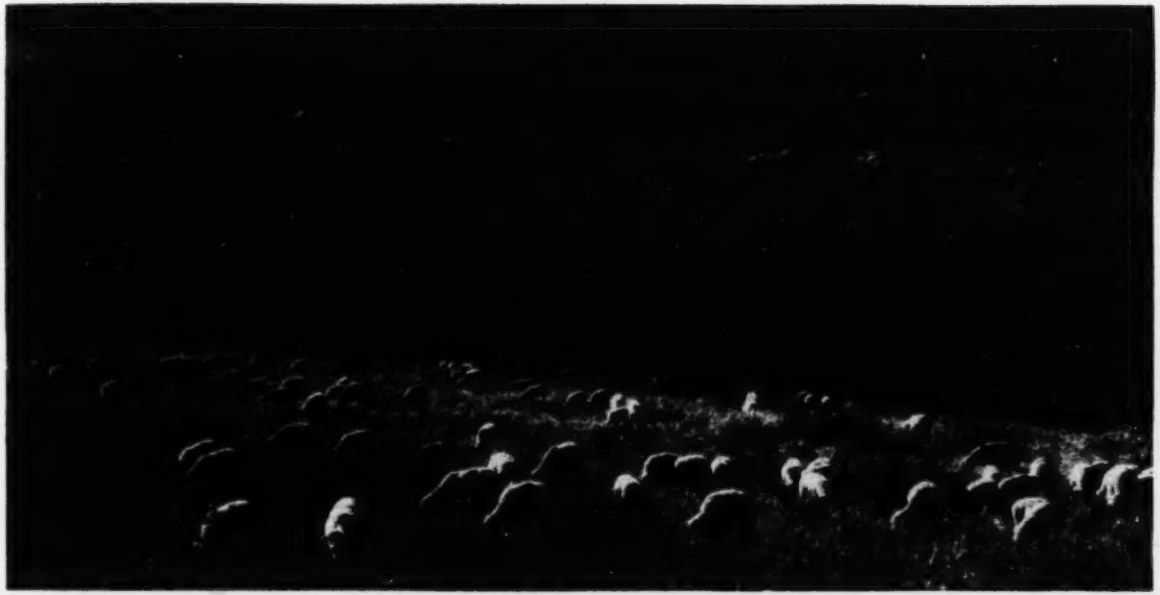

FIGURE 14.—Summer range on the Humboldt National Forest, Nevada. The summer range in this area has less tree growth than the Rocky Mountains or the Sierra Nevada Mountains.

(8) MIGRATIONS FROM THE MOUNTAINS OF WESTERN IDAHO AND EASTERN OREGON SOUTHWARD.—This migration area is in the Snake River drainage area. The Idaho section lies along the Snake River, and its shorter tributaries which flow from the high mountains of Idaho. The Oregon portion lies mainly within the drainage area of the Malheur River, a tributary of the Snake River.

In Idaho, the summer range is north and east of Boise, in the Boise, Idaho, Weiser, and Payette National Forests and adjacent private and grazing district lands (fig. 15). In Oregon, the summer range is in parts of the Ochoco, Malheur, Whitman, and Wallowa National Forests. One other summer range, called the Steens Mountains, is located in southeastern Oregon. This range is mostly of patented land surrounded by grazing districts. Although limited in extent, it is an extremely valuable seasonal range for the adjacent sheep operators.

FIGURE 15.—Typical Idaho summer range for sheep that are wintered in feed lots in eastern Oregon. Payette National Forest, Idaho.

This migration area does not include much winter sheep range. Sheep do spend some time on range in the early winter, after which they are fed or pastured near the home base and are shed-lambed, as in the Snake River Valley of Idaho. A considerable extent of this area is adapted to spring-fall and early winter use for both sheep and cattle. The Oregon spring-fall and early winter range is used primarily by cattle.

This migration area does not have so many trails nor are the movements so large as in some other areas, but several trails carry about 50,000 sheep each. Two of these begin in the mountains of Idaho and run generally westward, spreading out to farms and feed bases along the Oregon-Idaho border west of Boise. Some of these sheep continue westward to feed bases along the Malheur River. Sheep coming from Idaho summer range must cross cultivated areas, where they are restricted to roads and lanes. The points where they can

cross the Snake River between Oregon and Idaho are limited, forcing a concentration on certain areas and trails.

In eastern Oregon the Grazing Service has abolished old sheep driveways and is now establishing and marking a number of trails to conform to present use. These trails vary in width from a lane through deeded property to a mile on the grazing districts, and radiate from the Malheur River Valley.

A large acreage of new land has been placed under irrigation near Vale and Ontario, Oreg. Heavy stocks of accumulated hay must be disposed of principally by feeding to cattle, so sheep are being displaced in many instances.

Other sheep movements from central Oregon extend into the Whitman, Malheur, and Umatilla National Forests of eastern Oregon. These movements traverse private land before reaching the national forests, and the actual routes traveled could not be located in this study with the desired accuracy.

FIGURE 16.—Sheep from western Nevada on summer range in California. This is typical summer range in the ponderosa pine forest type, along the eastern slope of the Sierra Nevada Mountains.

(9) MIGRATIONS FROM SIERRA NEVADA, SISKIYOU, AND CASCADE MOUNTAINS EASTWARD TO THE GREAT BASIN.—A large number of generally small migrations move eastward from the high summer ranges of the Sierra Nevada and Cascade Mountains to the spring-fall and winter ranges of Oregon and Nevada.

Most of the winter range for California operators is in Nevada. Some of these operators, who have ranch bases in Lassen County, Calif., send their sheep as far south in Nevada as Lyon County. Generally, those operators who summer in California and have grazing privileges in Nevada make an eastward or southeastward movement. Operators who summer sheep on the Mono National Forest of California and surrounding lands travel northward to winter range in Douglas and Mineral Counties, Nev. Most of these operators have their ranch bases near the winter range in Nevada (fig. 16).

Operators in northeastern California who have no winter range in Nevada are usually forced to feed at ranches located near the California-Nevada border. Some operators from the Sacramento Valley use northern California for spring or summer range; they usually ship by rail from Red Bluff to Bieber, Calif. Trails in the northeastern California-Nevada area are governed almost exclusively by topography and water supply. Because of extreme fluctuation in water supply, alternate routes must be provided during dry years.

In Oregon, near Lakeview and Valley Falls, are two trails that carry about 40,000 sheep each. They extend from the summer range in the Fremont National Forest, and adjacent large bodies of private timber holdings, northeast to early winter range. Many of the sheep are fed over the winter, grazing on the range only in the late fall and early spring. Cattle predominate over sheep, and the volume of sheep trailing is not great.

(10) MIGRATIONS FROM DESCHUTES RIVER DRAINAGE AREA AND VICINITY NORTHEASTWARD TO WASCO, JEFFERSON, WHEELER, AND GILLIAM COUNTIES, OREGON.—The summer range of this migration area lies in the Deschutes National Forest and parts of the Willamette National Forest. Much summer range is also obtained on private timber lands in the Deschutes River Drainage. Most of the sheep that summer in this area come from private lands in these counties. The use of spring-fall range in this area by sheep occurs mainly during trailing to and from summer range. These animals virtually do not use winter range, because little or none is available; they are pastured and fed in the winter on the farms.

Movements are not so long nor so large as some movements in the Intermountain Region, but many difficulties are encountered. A considerable mileage of the movement north of Bend, and Prineville, Oreg. is through land that is chiefly in private ownership. The animals cannot be spread out, but are driven over roads and highways. The trail taken varies from year to year, depending upon the opportunity to buy feed and pasture, and the ability of the operator to get permission to cross private lands. The northern part of this migration area was not included in the study and the trails are not shown on the folded map.

NATURAL LAND USE UNITS FOR SHEEP

The described migration areas are natural land use units from the standpoint of range use by sheep. Therefore, far less interdependence exists between these large areas than between the smaller grazing areas analyzed in preceding pages. Most of the migration areas furnish 95 percent or more of the feed and forage necessary for the sheep based in each area (table 10). The small degree of interuse that does occur can be attributed mostly to sheep operations near the area boundaries.

These migration areas are probably the most logical units for study and development of range-administration programs involving sheep. On this basis, greater possibilities of improving range administration are evident. The administrative boundaries of much of the reserved public domain are artificial in character, with attendant difficulties of administration. Studying a combination of administrative units which conforms to a more natural land use area will materially assist in planning range programs.

TABLE 10.— *Percentage distribution of sheep-months use obtained by sheep classified in specified migration areas*

Migration area [1] No.	Operators classified in area	Sheep classified in area	Annual sheep-months requirement [2]	Distribution of sheep-months use obtained in migration area by sheep classified in the area					Distribution of sheep-months use obtained outside of the migration area				
				Grazing district	National forest	Patented land	Other [3]	Total	Grazing district	National forest	Patented land	Other	Total
	Number	*Thousands*	*Thousands*	*Percent*	*Percent*	*Percent*	*Percent*	*Percent*	*Percent*	*Percent*	*Percent*	*Percent*	*Percent*
1	632	813.0	9,755	29.3	13.3	55.5	.....	98.1	0.2	0.9	0.7	0.1	1.9
2	119	501.2	6,015	37.4	4.8	52.3	.....	94.5	.6	3.8	1.1	.....	5.5
3	279	620.3	7,444	41.4	8.9	47.9	.....	98.2	.5	.3	1.0	.....	1.8
4	418	435.0	5,220	45.8	8.9	37.7	0.5	92.9	1.7	2.5	2.9	.....	7.1
5	1,511	1,308.1	15,697	38.1	10.3	47.7	.6	96.7	2.3	.6	.3	.1	3.3
6	1,239	1,228.4	14,740	22.1	14.9	59.7	1.5	98.2	.7	.7	.4	.....	1.8
7	114	409.6	4,915	50.2	13.5	26.7	7.3	97.7	1.1	.3	.9	.....	2.3
8	270	641.5	7,698	21.9	13.8	63.4	.....	99.1	.....	.9	.....	.....	.9
9	251	560.8	6,729	35.7	10.4	49.0	.1	95.2	.8	.9	2.3	.8	4.8
10	81	133.8	1,605	6.3	18.2	75.5	.....	100.0	.....	.....	.....	.....	.....
Other [4]	117	192.9	2,314	5.3	2.9	48.7	20.5	77.4	4.6	13.0	5.0	.....	22.6
Total	5,031	6,844.6	82,132	32.3	11.3	51.4	1.5	96.5	1.1	1.4	.9	.1	3.5

[1] These migration area numbers correspond with those shown in figure 11.
[2] Number of sheep multiplied by 12. These figures have been rounded off and do not check in all cases.
[3] Includes other Federal lands such as Indian Reservations, National Monuments, and unregulated public domain.
[4] Operators not classified in any of the 10 migration areas.

PROBLEMS OF SEASONAL MIGRATION

Although the sheepman is most directly concerned with the necessity of moving his sheep between seasonal ranges, the resultant difficulties are by no means confined to his immediate sphere of activities. The movements of sheep and the destructive effect on soil and vegetation of these movements present problems to farmers and cattlemen, to public land administrators, and to the general public.

PROBLEMS FOR THE SHEEPMAN

When sheep must be herded over long distances in order to have an adequate supply of range forage at all seasons, the sheepman encounters many serious problems, and numerous items of expense would not be incurred if operations were confined to a smaller space. These problems are commensurate with the distances involved and the country through which travel must be made.

Long migrations have a serious effect upon the production from sheep. They sap the strength of the animals, with a resulting loss of breeding stock and a lower production of lambs. Migration from winter to summer range particularly brings many losses by death. "The greatest energy requirements come when the sheep migrate from the winter to the summer range. In addition to carrying a full fleece, the ewes at this time are heavy with lamb." [12] The weight lost by the ewes in trailing may be regained on summer range, but only through consuming considerable quantities of forage.

Many hazards are associated with the supply of feed, the condition of the animals, and the weather. Long migrations require that forage

[12] ESPLIN, A. C., GREAVES, J. E., and STODDART, L. A. A STUDY OF UTAH'S WINTER RANGE. COMPOSITION OF FORAGE PLANTS AND USE OF SUPPLEMENTS. Utah Agr. Expt. Sta. Bul. 277, 47 pp., illus. 1937. p. 44.

or feed for sheep be obtained along the route of travel. If forage is unobtainable, feed must be hauled (fig. 17). Often they are trapped on the trails by heavy snowfall, and losses are sustained even though feed is rushed to the animals.

Someone must go in advance of the movement and make arrangements for pasturage or feed. Sometimes it is not possible to buy this at reasonable prices and convenient locations. The sheep herder must be furnished with supplies while on the trail and while on the seasonal ranges. Sheep must be furnished with salt during the summer. In certain areas an insufficient water supply is a hazard. Animals may be hurried through areas where no water is available, thereby depleting their condition; or water must be hauled. Hauling feed and water to sheep on the range is laborious and expensive.

Roads leading to winter ranges are traveled chiefly by sheepmen and others who use the ranges. The small volume of motor traffic does not make it feasible to have improved roads. In many places

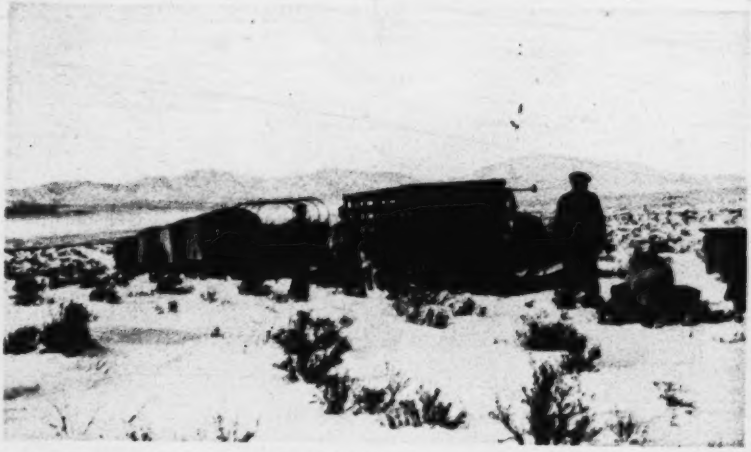

FIGURE 17.—Hauling concentrates to sheep on winter range in Nevada.

the terrain makes it extremely difficult to furnish supplies to the sheep herder and to the sheep. Difficulties of keeping constantly in touch with a large operation, where the migration is 200 miles or more, and of furnishing the necessary supplies when they are needed can easily be imagined.

In many places sheep migrations must follow regular highways, particularly where canyons are the only entrance and exit to many summer ranges. Vehicular traffic slows the movement, and the labor of herding is materially increased by the necessity of clearing the highway for passage of vehicles. Both sheep and herders are exposed to the possibility of serious injury. Sometimes it is possible to fence off a driveway along the edge of the road (fig. 18).

Sheep on the trail are likely to eat poisonous plants in lethal doses, because of their hunger and the lack of a selective choice of other forage. Along trails forage is grazed and trampled out, allowing poor and even poisonous forage species to encroach.

PROBLEMS FOR THE FARMERS AND SMALL CATTLEMEN

Owing to topography, soils, precipitation, and stream run-off, diversified farming or ranch headquarters for cattlemen are located where streams emerge from the mountain country into the valleys. Land surrounding such points is usually spring-fall range, although it may sometimes be suitable for other seasonal use. If an area of this type is located on or near a major sheep trail, serious problems may arise for the farmer or for the small cattleman. Sheep on their way to their seasonal ranges may completely utilize the available forage for some distance around the irrigated farming lands. The farmer or rancher then is left without spring-fall range to balance with the hay and feed produced on his irrigated farm and his summer range. His yearlong supply of forage has sometimes been seriously impaired. Although the sheep may take only 10 or 20 percent of the total forage in an area, this feed loss may seriously cripple the cattle industry

FIGURE 18.—A sheep driveway fenced off from the highway.

there. These difficulties are being corrected in many cases by the establishment of driveways and by other measures of the Grazing Service.

On the other hand, sheep migrating from one seasonal range to another have furnished a market for hay and pasturage to the farmers who live on the route. Sometimes these farmers have received very high prices for hay that would otherwise have been unsalable. Markets of this type have serious limitations, however, because they are not dependable from year to year, for in moderate or average winters the sheepmen may not need to buy hay or pasture whereas in severe winters they may be willing to buy all available hay at moderately high prices.

The effect of seasonal migrations of sheep upon the range itself imposes additional burdens upon the public-land administrator. Range management and distribution plans are generally developed on

the basis of grazing of livestock. Livestock trailing means serious additional problems of range management. In some instances, the number of sheep moved over the trail seem to impose problems in certain areas that are impossible to solve on the basis of good range management. That is, the number of sheep that use a given area may be so great that it is impossible to prevent damage to these lands. A chief consideration for the public-land administrator is the provision of stock water and bedding grounds for range sheep along the major trails and the building of truck trails to range areas that are now inaccessible to vehicles. These may involve large expenditures.

PROBLEMS AFFECTING RANGE LAND

Concentrations of range sheep along major trails have inevitably brought serious depletion of vegetal cover. Many of these trails have 100,000 sheep moving over them twice each year. Even in the widest of these, probably more forage is trampled out than is actually used by the sheep. Therefore, it is sometimes best to narrow the trail in order to confine damage to a smaller tract. In any case, forage vegetation along trails will eventually be destroyed.

Crops on small farms along the routes are sometimes damaged by migrating sheep. The animals on the road or driveways are prone to break into green fields, especially if they have been driven long and are hungry. Sheep, trailing from winter range, have been known to enter a spring-grain field and entirely destroy the crop. Sheep migrations permit a more complete utilization of range areas, but some types of agriculture are injured by them

PROBLEMS FOR PUBLIC-LAND ADMINISTRATORS

Problems of the public-land administrator have been only briefly suggested. The comparatively long seasonal migrations of sheep in the Intermountain Region and the extreme interdependence of various areas mean that a public-land administrator has control over only a part of the land used by sheepmen with which he is most directly concerned. He must give consideration to the efforts of other public-land administrators. Furthermore, cooperation must be maintained between public-land administrators and public agencies that are engaged in conservation activities on private lands.

Notwithstanding the seriousness of overgrazing by concentration of sheep in small areas, the effect of trailing on soil is even greater. With as many as 100,000 breeding sheep crossing an area twice each year, and with an almost equal number of lambs crossing in the spring, the effect upon the soil is very serious. In walking over the land, the animals' hooves disturb the surface and expose it to accelerated erosion. The soils of arid areas, which even in the pristine state are highly susceptible to disturbing influences, erode quickly when trailing is introduced. This combination of vegetal depletion and soil disturbance quickly brings destructive erosion. On some trails, this erosion has progressed to such a point that the trail is impassable to stock, or its use has been seriously impaired.

PROBLEMS FOR THE GENERAL PUBLIC AND PUBLIC AGENCIES

The general public has a direct interest in the problems resulting from sheep migration, and particularly in erosion. Where trails follow stream channels, as they frequently do, vegetal depletion has created a serious flood hazard. In much of the Intermountain Region summer storms of some intensity are common. If a part of the range area of the stream is seriously depleted of its plant cover, the flood hazard is greatly increased. Major sheep trails have depleted the cover on an appreciable part of watersheds and in stream bottoms where vegetation helps to retard the flow of water. Many of the towns and villages are located on or near streams, particularly where they emerge from the mountains into the valleys. The possibility of flooding has probably been increased by the extensive sheep trailing.

FIGURE 19.—Each spring and fall sheep on highways impede the motorist and endanger themselves.

Disastrous flooding of small hamlets at entrances to drainageways is not uncommon in the region.

The general public must also contend with the inconvenience and hazard to vehicular travel caused by sheep on the main roads and highways (fig. 19). The motorist meets a band of sheep at intervals of a few miles. He is annoyed by the delay and, in attempting to avoid running into them, may have minor accidents. So he is naturally inclined to resent the sheep on the highway and to overlook the fact that he constitutes a serious hazard to the sheepherder and to the sheep.

Recreational areas may be seriously damaged by sheep passing through them. For instance, many canyons and park areas above communities, used in the Intermountain Region for recreational

purposes, may also offer the best approach to the range. The sheep trails through them reduce their esthetic values.

Problems of the county tax bodies are increased by these migrations. Sheep grazing in a county where the operator owns no other taxable property may either escape taxation or else not bear its proportionate share thereof. It is difficult for counties to apportion taxes on sheep equitably. The productive capacity, extent, and quality of forage obtained may fluctuate widely between counties, so that taxation on a basis of the proportion of the year the sheep spend in the county is inequitable. This is almost the only practicable basis, but with sheep migrating as they do it is difficult to know the proportion of a year spent in any one county by a sheep operation.

Intermingling of sheep from several States on one seasonal range requires that the States exercise some vigilance in animal inspection to prevent the spreading of diseases peculiar to sheep or other animals. An example might be cited for the Colorado summer range, where sheep from New Mexico, Colorado, and Utah mingle.[13]

Movement of sheep complicates the reporting of census figures for livestock. Census data taken at different times of year are likely to be inaccurate in reporting the sheep population in counties with one predominating type of seasonal range. Fluctuation in numbers of sheep reported in the census for various years is shown for selected counties in table 11.

Counties that show larger numbers of sheep on January 1 have a predominance of winter range or feeding grounds. Other counties with larger numbers of sheep on April 1 predominate in spring and summer range. Most of this fluctuation is due to the migratory character of the range-sheep industry, although some can be ascribed to lambs born before April 1.

A logical recommendation would be to have the census taken at the same time each year, but the time of census taking is fixed by statute for the country as a whole, and not for any one State or county. Census enumeration of sheep numbers in this region could be improved by assigning a definite home area or base to each sheep operator. In this way census figures would be comparable from period to period in the future.

TABLE 11.—*Comparison of census data on sheep numbers in selected counties, Intermountain Region*

State and county	Sheep of all ages, census of—		
	Jan. 1, 1925	Apr. 1, 1930	Jan. 1, 1935
Utah:	*Number*	*Number*	*Number*
Sanpete	106,345	100,747	199,723
Utah	136,235	244,513	137,228
Beaver	104,411	25,804	61,030
Nevada: Elko	185,894	358,262	178,400
Idaho: Ada	78,326	236,159	56,433

[13] Utah State Bd. Agr. Bien. Rpt. (1932-34) 7: 67.

OPPORTUNITIES FOR IMPROVING USE OF FORAGE RESOURCES

Although migrations of sheep from one seasonal range to another are a necessary corollary of the existence of seasonal ranges, and although serious problems inevitably arise from such seasonal migrations, it seems possible to suggest several ways by which the serious effects of seasonal migrations can be lessened and by which the value of forage resources can be increased.

Ways of Reducing Migration

EXCHANGING LAND AND GRAZING PRIVILEGES

One of the most obvious possibilities is to reduce the length and volume of seasonal migrations by exchanging private range lands and by exchanging public range-land grazing privileges. Numerous cases were found in which sheep bands meet and go on in opposite directions, each on the way to a fairly distant range which is more readily accessible to the other. Reasons for the apparent waste of time and effort in obtaining seasonal range use can be found in the pattern of ownership resulting from previous disposal and reservation of lands.

Changes that would simplify the sheep-trailing problem must be based upon wholehearted cooperation of the sheepmen, governmental agencies, and holders of large blocks of private land. The length and volume of sheep migrations can be reduced by an effective exchange of grazing permits or licenses and accompanying private holdings.

An operator who feels that his set-up is relatively stable, even though he travels long distances for seasonal range use, is reluctant to transfer his public land-grazing preferences. He has operated in the same way for several years and probably feels that he has satisfactorily worked out his problems. In many areas the demand for range is greater than the supply, and the sheepman hesitates to give anyone the opportunity to divorce him from the range he has obtained. That exchanges may involve many operations is a chief factor in this question. Sheepmen acting alone run the risk of losing rather than gaining by exchange of range land; but the entire use pattern should not be so fixed that it cannot be modified to the mutual benefit of all.

CHANGING OPERATING METHODS

Serious consideration must be given to possibilities of changes in methods of operation of the range-sheep industry in the Intermountain Region. Shipping of sheep by railroad or motortruck would reduce sheep trailing. But shipping by railroad between seasonal ranges offers only limited possibilities because (1) many major movements do not parallel railroads, (2) favorable railroad rates have not been available to the sheepman for shipment of breeding stock, and (3) most of the operators are not yet convinced that it pays to ship breeding animals by rail. Trucking of breeding animals probably will increase

in the future, because of the better type of equipment now available, and the truck-trail construction program on public lands.

Lambs have been trucked from summer range to shipping point in several areas in the region (fig. 20). This seems to have been a successful and profitable operation in numerous instances.[14] Trucking of breeding sheep has not become an established practice as yet. It is fairly easy to calculate the advantages and disadvantages of trucking lambs from summer range to market. Costs can be accurately calculated and benefits measured in terms of additional weight or better quality of the lambs at the loading point.

It is much more difficult to calculate the advantages and disadvantages of trucking breeding sheep between seasonal ranges. Costs can be learned with equal accuracy, but benefits are more difficult to measure. A fairly small increase in the lamb crop or a reduction in

FIGURE 20.—Lambs being loaded on double-deck motortruck for haul from summer range to shipping point. Sawtooth National Forest, Idaho.

the death loss throughout the year would easily offset any costs involved in trucking. For instance, if the cost of trucking a band of 1,200 ewes is $360 for 150 miles, this would be offset by about a 7-percent increase in better quality marketable lambs in the fall. It would probably be difficult, however, to demonstrate that a difference in lamb crop of 7 percent was due wholly to the trucking of sheep from winter to summer range. Similar comparisons could be made for death losses.

Another change in operating methods that should be given consideration is the possibility of feeding sheep during the winter rather than using hazardous winter range. There are winter-range areas in the region from which forage production is so low and on which operating conditions are so hazardous that it seems doubtful whether

[14] SAUNDERSON, MONT H. A COMPARISON OF COSTS OF TRUCKING AND TRAILING LAMBS FROM SUMMER RANGE TO SHIPPING POINT. U. S. Forest Service, Intermountain Forest and Range Expt. Sta., 5 pp. 1939. [Processed.]

these ranges now have any real value. Many of these ranges have been used to the point of exploitation during the past and cannot possibly be so used indefinitely.

Some difficulties are involved in feeding sheep during the winter. These have been solved successfully in parts of the region, but in other parts the winter feeding of sheep is almost unknown. Major shifts from grazing to feeding would be limited by the willingness and ability of the sheepmen to learn to feed sheep in the winter, but the greatest limitation to a major shift is the available hay supply. Many parts of the Intermountain Region have insufficient hay to feed all of the range sheep during the winter, even if this were a desirable practice. Most of the winter-range area probably will continue to be used in somewhat its present manner, but parts of it may undergo considerable change in use during the next decade.

Ways of Facilitating Necessary Migrations

If all the unnecessary seasonal migrations were eliminated, a considerable volume of seasonal movements of range sheep would remain.

IMPROVEMENT OF TRAILS

Most trails can be improved in some respects. Relocation or establishment of alternate trails is not always possible, but alternate trails are desirable from the standpoint of soil, forage, and water. Where established trails are used year after year, it is desirable that other livestock be prohibited from grazing near the trails, so that grazing would be held to a minimum and the forage could be used by the migrating animals. Driveways through settled areas and intensively farmed areas should be securely fenced. Fencing where the topography is rough is advisable if it prevents injury to the animals.

Although much has been accomplished by the Emergency Conservation Works program in building roads and trails on public lands, far more of this type of work is needed, to lower the costs of operation to the sheepmen and to facilitate better use of the range.

IMPROVEMFNT OF FACILITIES

Considerable work remains to be done in providing proper bed grounds and facilities for feeding and watering sheep while they are on the trail. The quantity of forage obtainable along the trail decreases as newly established trails are subjected to use. Increased feeding on the trail may become necessary. Water facilities have been improved during recent years, and continuance of this kind of improvement will help to maintain the range and reduce the hazards of operation. More frequent stock-watering places will reduce the overuse around each.

Solution Requires Concerted Effort

Responsibility for administration of the greater part of the public-range resources in the Intermountain Region lies with the Forest Service and the Grazing Service. Any over-all redistribution of public-range use to reduce trailing must be cooperatively initiated by these agencies.

Both the Forest Service and the Grazing Service have established organizations that can give assistance and cooperation in reducing indiscriminate sheep trailing. Livestock associations, grazing-district advisory boards, and soil conservation districts can offer valuable assistance on the sheep-trailing problems. The county land use planning activities provide one means of gaining concerted action on this problem, and the governing bodies of the soil conservation districts are particularly well fitted for attacking problems of sheep migration and range use on private lands.

The main deterrent to reduction of unnecessary sheep movements is the vast acreage that must be encompassed in a range area to include all of the seasonal forage requirements for stock. When such an area includes several counties in one or more States, with several types of landownership, the problems increase in proportion. Furthermore, the administration of public grazing lands of a complementary nature by two or more agencies operating under different acts of Congress and with different administrative regulations, tends to increase the difficulty of planning and executing over-all range programs.

One avenue of adjustment that is frequently suggested for dealing with the local situation is to prohibit trailing through a particular area. This may solve the problems of the area in question, but it is likely to result in equally serious or even greater problems for some other area. Seasonal range forage of the Intermountain Region is a valuable resource which should be utilized as fully as possible, consistent with maintenance of productive capacity. Extreme provincialism will prevent a solution of the problem of resource management in the region.

In evolving a program of seasonal range management and efficient use of the resources, it is necessary to have accurate and complete information regarding the nature of the problems. An effort has been made to present some of this information herein and to suggest briefly an analysis of the problems and some possible improvements. Far more detailed planning by local groups will be necessary if these suggestions for improvements are to be translated into accomplishment. Even after recommendations are worked out by local groups, considerable time will doubtless be required to fit the recommendations into an over-all plan for better range use in the Intermountain Region.

DISCUSSION AND SUMMARY

A definite pattern of life is followed by the rancher who operates sheep on our great Western range lands. In the summer, the animals graze on the high mountains, most of which are in national forests. In the fall, to escape early snows, the sheep literally pour out of the mountains down canyons, roads, and highways, through fields, towns, and villages. The flocks, in excellent condition from 2½ to 3 months of grazing on the green, fast-growing mountain forage, spread over the fall ranges, where most of the ranches and private lands are located.

The lambs, weighing about 80 pounds, are sold as feeders for fattening or as grass fat for slaughter. The breeding flocks spend 6 to 10 weeks on farm fields, ranges, and pastures, being conditioned for the trek to the winter desert range. November sees the first movements

of sheep to the distant desert ranges allotted under the control of the Grazing Service.

Through the winter, the sheep operator must cope with a rigorous climate. The forage shrubs and grasses are dormant, dry, and tough. If snow, the only source of water for the animals, is late, entrance to the range also is late. If the snowfall is heavy, the forage is covered and feed must be hauled in.

Usually in March the sheep start back to the spring range, the range that was used in the fall. The ranch headquarters is generally located here, and the operator attempts to arrive on this range in time for lambing and shearing. While the flock is being sheared, snowstorms and freezing spells can cause high mortality among shorn ewes.

After 6 to 8 weeks on spring range, the forage becomes short, water becomes scarce, and the general movement to summer range begins. Again the mass moves up the canyons, roads, and highways, facing the dangers of topography, narrow trails, and vehicular traffic on the highways. Finally, the summer range is again reached.

Just as any crop must be harvested at certain seasons of the year, seasonal range forage must be harvested at a definite time. And just as agricultural laborers often follow the harvests from place to place, sheep migrate to harvest the forage.

Climatic and topographical conditions divide the intermountain range area into three major classes—winter range, summer range, and spring-fall range. The Intermountain Region includes all of Nevada and Utah, more than half of Idaho, a major part of Colorado, Wyoming and Oregon, and small parts of Arizona and California.

The summer range cannot be used in the winter because of snow, and the winter range cannot be used in the summer because of lack of water. Animals cannot be moved to summer range until the forage is ready. The plants must be given time to develop leaves and store food in the roots, thereby insuring proper growth of forage for the following year.

Thus, the range-management technician has developed the concept of "range readiness," or that time when the forage has matured sufficiently to prevent range deterioration and keep the animals in good flesh. The sheepman is at the mercy of climate in deciding when and how much he should use his range.

In many ways the spring-fall range, the stopping place between the summer and winter ranges, is the buffer or critical portion of the year's operation. Climate and forage vary greatly from year to year, but the sheep must be kept on it in spring and fall until the other ranges are ready. Therefore, the spring-fall range has become depleted to comply with the physical limitations of the summer and winter ranges.

If proportionate amounts of the various seasonal ranges are not conveniently available, the sheepman may obtain a balance between seasonal ranges by reducing livestock numbers to the capacity of the least productive seasonal range, buying or leasing additional sources of forage nearby, moving considerable distances to obtain necessary seasonal ranges, grazing some ranges at a time that is undesirable from the viewpoint of maximum forage production, or overgrazing a range until other seasonal ranges can be satisfactorily grazed.

Interdependence of Range Areas

Sheep located in an average grazing area depend upon four to five additional grazing areas for the yearly forage requirement. Or, conversely, the average grazing area furnishes forage to sheep coming from four or five other places. Twenty-six percent, or 1,287 out of 5,031 operators, depend upon two or more grazing areas for sheep forage. (In general, these are the larger operators. An operator with few sheep cannot afford to drive them beyond his grazing area unless his base happens to be near the border or unless he can combine his band with that of a neighbor.) Of the 5,031 operators permitted on Federal range lands, 3,744 used one area only; 1,131 used two areas; 142 used three areas; and 14 used four areas.

Land Pattern and Control of Seasonal Ranges

The methods whereby land was acquired, distributed, controlled, or reserved in the western United States have had an important bearing on the present pattern of use of range lands. The various land laws did not distribute the land in large enough units for grazing purposes. The railroads were granted large checkerboard strips of land through range areas. Individuals acquired small parcels around water holes, making possible the control of large areas. This indiscriminate disposal has tended to hinder the proper use of range lands.

National forests, established before 1900 in some instances, have been under the direction of the Forest Service of the Department of Agriculture for more than 30 years. These areas contain large parcels of range land, predominantly summer range, although some spring-fall and winter range is included. Since 1934, most of the public range, remaining unreserved and unappropriated, has been brought under positive management by the newly organized Grazing Service of the Department of Interior.

Other public ranges of smaller extent are managed by the Bureau of Indian Affairs, the National Park Service, Soil Conservation Service, and other agencies. Most of the grazing districts are winter and spring-fall range.

The individual sheepman may operate entirely on owned or leased land or on a combination of private and public lands. For some operators, the combinations of seasonal ranges and kind of land control may be simple in character and the various ranges nearly adjacent. Other operators may operate on ranges controlled by many agencies and these ranges may be many miles apart.

On the basis of the control of the land upon which they operate, 33 percent of the operators are using grazing districts, national forests, and private land; 39 percent are using grazing districts and private land; and 26 percent are using national forests and private land. The percentage of operators using grazing districts and national forests varies widely between areas, depending upon the area and quality of range offered by these two types of landownership.

The ratio between the numbers of operators permitted on national forest and grazing districts is not indicative of the sheep-mouths forage obtained from these types of Federal landownership, because the area, size of operation, and length of grazing season are all generally greater on the grazing districts.

Although the acreage of public lands in the grazing areas studied far exceeds the acreage of patented lands, only 51 percent of the forage of sheep using public lands is obtained on public range. The low grazing capacity of the publicly owned winter range and the relatively high forage-producing capacity of the private cultivated forage land largely explains this low percentage.

Sheep Migration and Seasonal Ranges

Because seasonal ranges exist, the sheep must either be shipped or trailed to them. No seasonal range can be fully stocked yearlong without deterioration of grazing capacity. If complementary seasonal ranges are adjacent, the migration is only local in character, but much of the winter range may lie great distances from summer range, and the movement of sheep may entail crossing one or more counties, grazing districts, or national forests.

The volume and length of some of these seasonal sheep migrations are surprisingly great. Twice each year more than 100,000 ewes pass over several trails in Utah where topography forces concentration. Over parts of these trails young lambs add to the movement.

Throughout the Intermountain Region are numerous trails which 50,000 or more breeding animals traverse annually each way. Topographic conditions, such as canyons, mountains, and lakes, towns and farm lands, markedly influence the routes followed.

In some places, the sheep are forced into narrow trails, because the mountainsides are steep and the canyons narrow, or because only the roadway is a public thoroughfare. In other places, the sheep can spread out over wide areas and can graze as they travel.

Most of the small bands do not travel more than 50 miles between their most distant ranges; but, as the number of sheep per operation increases, the travel distance becomes greater. When owners of small bands must drive their sheep far, they combine their bands into units of at least 1,500 for economic trailing. Of 804 operators who have more than 2,250 sheep, 369, or 46 percent, travel more than 100 miles twice each year. When the sheep reach their grazing allotments, additional movement takes place to obtain the daily ration of forage.

Problems Resulting From Sheep Migration

The long seasonal migrations of large numbers of sheep are responsible for serious problems to the sheepman, to the range land, to small ranchers en route, to the public land administrator, and to the general public.

Long migrations sap the strength of sheep, with resultant high mortality and reduced lamb crops. Operating costs are increased because of travel to the range from the ranch headquarters and return. The operator cannot exercise close supervision over his entire business without large costs in time and money. The life of the sheepman and his herders is made more difficult by the distance they must travel. The hazards, trouble, and costs must be balanced against the value of the forage obtained.

When the sharp hooves of 100,000 ewes and nearly as many lambs trample the vegetation and soils of a small area twice each year, the

effect can readily be imagined. Plants are grazed very closely and then trampled out; the bare soil is loosened and soon erodes rapidly. Gullies have developed along some former sheep trails until they are no longer passable to stock. Sheep trailing represents one of the severest land uses known, and soils in the arid region, with their sparse vegetation, are ill-suited to such heavy use.

The public-land administrator has many serious problems as a result of sheep migration. In the mountain areas, the natural trailways are in the canyons, which often have considerable scenic and recreational value if not damaged by sheep movements. The erosion of trails becomes a serious matter to the land administrator. Sound range management involves proper distribution of animals over the range, and proper utilization of the available forage. But if trails enter or cross a range unit, forage is depleted by concentrated grazing along them; while in other sections of the unit, forage may be only partly used.

Possibilities for Improvement

Several possibilities for improvement are evident. Often the length and volume of sheep migrations could be reduced by exchange of private holdings and better allocation of permits and licenses to use public ranges. For instance, two bands may meet and pass each other going to their respective seasonal ranges. An exchange would eliminate needless trailing for both.

Most of the sheep trailing of the Intermountain Region is inevitable as long as the ranges are used. Trails can generally be improved. Careful relocation can reduce the hazards to soil and vegetation. Water can be developed, to lessen the death losses en route. It may be necessary to arrange for feeding hay or grain at places along trails.

Trucking instead of trailing sheep is another possibility. Lambs ready for market are frequently trucked, but, as yet, few operators are convinced that trucking will pay in the case of breeding animals. One difficulty is that many roads are poor, even impassable to trucks during stormy weather. Some sheep are shipped by rail, but again, most operators are not convinced that this pays. Few of the railroads parallel present trails, or even lead from summer to winter range.

Feeding of hay on farms may prove more economic than trailing, at least to some winter ranges where the forage obtained is hardly worth the cost of going to it. This would not lessen trailing to and from summer ranges. At present, many parts of the Intermountain Region produce insufficient hay to feed range sheep in winter, even if operators were convinced that it paid to do so.

APPENDIX

Methods and Scope of Study

Statistical data for this circular were obtained from the 1938–39 sheep permits and licenses of the Forest Service, Grazing Service, and the Office of Indian Affairs Field Service. The sheep-months use on the grazing districts, national forests, and other public lands were carded and calculated from the use records of these agencies. If an operator had use on two or more types of public land, the cards for each type of permit or license were placed together so that the operator's total year's use was obtained. The card or cards of each operator were classified in the grazing area where he obtained most of his sheep-months use.

When sorting the records it was observed that a few large owners were handling their sheep in several operations, which were entirely unrelated except as to ownership. In some cases the sheep were in different States. Accordingly, these ownerships were separated into definite units as the records indicated. In other cases of large ownership, if the sheep were operated in the same area, in the same type of operation, regardless of the number of bands run, they were considered as one operation.

The sheep-months use on patented land was obtained as follows: If the patented range land of an operator is intermingled with public land, the use record shows the percentage of time spent on each type of land. Then if the operator's use of public range and any intermingling patented land does not total 12 months of use, obviously the remainder must come from some type of patented land. The operator's remaining use on patented land usually consisted of time spent near the home base, on feed, pasture, or range, and conducting such operations as lambing, shearing, and breeding. Therefore, it is evident that no acreage figures were obtained, and the statistical information on sheep-months use cannot be converted into terms of acres used by a sheep operator in his yearly operation.

The numbers of sheep using the various trails were learned from the above-mentioned data, from trailing licenses and permits, and from personal consultation and study with the field officers of the Federal services. Location of the trails on each national forest was obtained, chiefly from the detailed range-management maps in the office of the forest supervisor. Locations of established sheep driveways on the grazing districts were obtained from maps of the Grazing Service. Customary-use trails were obtained by consultation with the various district graziers of the Grazing Service, the county agents, sheepmen, and others who had knowledge of operating methods.

Information on operating methods, forage conditions, erosion, water supplies, and miscellaneous items of the grazing areas and major driveways was gained from extensive field observations. Further

information on these points was supplied by the field officers of the mentioned public agencies.

This study includes only those sheep in the Intermountain Region which were permitted or licensed in 1938–39 to graze on public lands. For range sheep that use one or more seasonal ranges, the study probably has practically 100-percent coverage, as the animals would either use, or trail across, some type of public land.

There are some areas, however, where sheep may use private range, or pasture and feed lot, and no public range; they are small farm flocks and their percentage of the total number of sheep is exceedingly small. Comparison of the number of sheep classified in the region studied with the 1935 Census of Agriculture, shows that the sheep included in the study exceeded census approximations (table 12).

TABLES

TABLE 12. *Comparison of sheep numbers, 1935 Census of Agriculture, with permits and licenses on public land, by States or portion of States, Intermountain Region, 1938–39*

State or portion thereof included in study [1]	Ewes, 1935 census [2]	Breeding animals permitted or licensed, 1938–39
	Number	*Number*
Northern Arizona	36,166	44,087
Northern California	104,622	99,045
Western Colorado	564,242	727,473
Southern Idaho	1,662,413	1,696,933
Nevada	[3] 563,709	669,225
Southern Oregon	613,057	478,504
Utah	1,921,113	1,810,621
Southwest Wyoming	884,676	1,064,216
Total	6,369,998	6,607,494

[1] Does not include the "other" areas, as their extent and numbers of sheep are unknown.
[2] Figures for portions of States are approximations from State totals based upon counties.
[3] Does not include certain unregulated sections of Nevada.

TABLE 13.—*Source of annual sheep-months use obtained in all areas by sheep classified in specified home grazing areas, Intermountain Region, 1938–39*

Home area of sheep	Total operators classified in home area	Number of sheep	Annual sheep-months requirement	Sheep-months' use obtained in home area				Sheep-months use obtained outside home area					
				Grazing district	National forest	Patented land	Total	Area	Operators [1]	Grazing district	National forest	Patented land	Total
	Number	*Thousands*	*Thousands*	*Thousands*	*Thousands*	*Thousands*	*Thousands*		*Number*	*Thousands*	*Thousands*	*Thousands*	*Thousands*
Arizona 1	20	44.0	528	331	6	29	[2] 378	Nevada 5	2	18			18
								Nevada unregulated	1				[3] 6
								Utah 4	12	19	16	91	126
								Total	13	37	16	91	[3] 150
California 2	87	99.0	1,188	285	104	530	919	California, other	3		25	6	31
								Nevada 2	18	117		74	[2] 198
								Nevada 3	2	16		4	20
								Oregon 2	5		3	17	20
								Total	24	133	28	101	[2] 269
California, other	14	30.5	366		18	244	262	California 2	11	9	36	25	70
								Nevada 2	1	2		13	15
								Nevada 3	2	4	5	10	19
								Total	14	15	41	48	104
Colorado 1	124	178.6	2,143	543	217	1,110	1,870	Colorado 3	5	(4)	26	1	27
								Colorado 6	8	19	5	21	45
								Colorado, other	7		35	10	45
								Utah 6	9	83		2	85
								Utah 8	10	50		21	71
								Total	33	152	66	55	273

[1] The total number of operators using areas outside of home area generally is less than the sum of the operators using each outside area, because some operators use two or more outside areas. (See table 5.)
[2] See footnote 2, table 7.
[3] See footnote 3, table 7.
[4] Less than 500 sheep-months.

TABLE 13.—*Source of annual sheep-months use obtained in all areas by sheep classified in specified home grazing areas, Intermountain Region, 1938–39*—Continued

Home area of sheep	Total operators classified in home area	Number of sheep	Annual sheep-months requirement	Sheep-months use obtained in home area				Sheep-months use obtained outside home area					
				Grazing district	National forest	Patented land	Total	Area	Operators	Grazing district	National forest	Patented land	Total
	Number	*Thousands*	*Thousands*	*Thousands*	*Thousands*	*Thousands*	*Thousands*		*Number*	*Thousands*	*Thousands*	*Thousands*	*Thousands*
Colorado 3	249	259.0	3,108	392	396	1,903	2,691	Colorado 1	6	15	5	1	21
								Colorado 4	5	50	4	10	64
								Colorado, other	4		29	16	45
								Utah 6	15	244		37	281
								Utah 8	1	5		1	6
								Total	23	314	38	65	417
Colorado 4	179	179.5	2,154	239	409	1,358	2,006	Utah 6	14	116		22	138
								New Mexico	3				[1] 10
								Total	17	116		22	[1] 148
Colorado 6	45	110.3	1,324	367	55	680	1,102	Colorado 1	3	40		3	43
								Colorado, other	1		21		21
								Utah 8	1	5		5	10
								Wyoming 3	11	56	9	27	92
								Wyoming 4	4	51	5		56
								Total	16	152	35	35	222
Colorado, other	17	27.5	330	14	15	213	242	Colorado 1	1	10			10
								Colorado 3	11	5	42	11	58
								Colorado 6	4	6	4	6	16
								Utah 6	1	4			4
								Total	17	25	46	17	88
Idaho 1	171	456.2	5,474	1,005	874	3,374	5,253	Idaho 2	5	9	13	20	42
								Nevada 1	5	15	71		86
								Oregon 3	6	10		18	28
								Oregon 4	7	39		26	65
								Total	19	73	84	64	221

Idaho 2	589	584.8	7,017	1,456	667	3,994	6,117	Idaho 1	63	205	28	20	253
								Idaho 3	32	160		31	191
								Idaho 4	24		148		148
								Southeast Idaho	17		75	28	103
								Nevada 1	20	49	87	17	153
								Utah 1	15	18	10	24	52
								Total	138	432	348	120	900
Idaho 3	132	133.6	1,603	437	211	709	1,357	Idaho 2	6	3	3	33	39
								Idaho 4	9	53	23	17	93
								Southeast Idaho	19		13	101	114
								Total	34	56	39	151	246
Idaho 4	141	102.7	1,232	421	234	576	1,231	Idaho 3	1	1		(4)	1
								Total	1	1		(4)	1
Southeast Idaho	378	419.1	5,029		653	3,139	[3] 4,039	Idaho 2	33	50	72	18	140
								Idaho 3	154	409	95	98	602
								Nevada 1	6	132		(4)	132
								Utah 1	8	25	4	41	70
								Wyoming 4	13	34		12	46
								Total	200	650	171	169	990
Nevada 1	66	285.4	3,425	961	540	915	2,416	Idaho 1	2	10		2	12
								Idaho 2	1		16		16
								Nevada 2	5	128		142	270
								Nevada 3	5	27			27
								Nevada 4	16	298		25	323
								Nevada, unregulated	14				[3] 317
								Utah 1	2	17		27	44
								Total	30	480	16	196	[3] 1,009
Nevada 2	33	102.9	1,235	513	52	483	1,048	California 2	3	24	4	11	39
								California, other	8		11	78	89
								Nevada 3	4	44		5	49
								Oregon 2	3	7		3	10
								Total	15	75	15	97	187

[3] See footnote 3, table 7.
[4] Less than 500 sheep-months.
[5] Use obtained in New Mexico is shown only for operators who spend part of the year in the Colorado 4 area. Data are not available as to the distribution of sheep-months use of these operators in New Mexico between Federal and patented lands.

TABLE 13.—*Source of annual sheep-months useobtained in all areas by sheep classified in specified home grazing areas, Intermountain Region, 1938–39*—Continued

Home area of sheep	Total operators classified in home area	Number of sheep	Annual sheep-months requirement	Sheep-months use obtained in home area				Sheep-months use obtained outside home area					
				Grazing district	National forest	Patented land	Total	Area	Operators	Grazing district	National forest	Patented land	Total
	Number	*Thousands*	*Thousands*	*Thousands*	*Thousands*	*Thousands*	*Thousands*		*Number*	*Thousands*	*Thousands*	*Thousands*	*Thousands*
Nevada 3	67	176.7	2,121	795	352	758	1,905	California 2	4	4	21	39	64
								California, other	4		1	31	32
								Nevada 1	1	16	27	16	59
								Nevada 2	2	3		4	7
								Nevada, unregulated	2				[3] 54
								Total	10	23	49	90	[3] 216
Nevada 4	48	124.2	1,490	1,028	120	179	1,327	Nevada 1	2	9	3	26	38
								Nevada, unregulated	7				[3] 42
								Utah 2	3	10		26	36
								Utah 3	7	29		2	31
								Utah 4	2	4		12	16
								Total	20	52	3	66	[3] 163
New Mexico	38	53.6	643				[4] 474	Colorado 4	38	20	125	24	169
Oregon 1	24	30.0	360	18	31	272	321	California 2	8		33		33
								Oregon 2	1		6		6
								Total	9		39		39
Oregon 2	94	182.2	2,186	588	165	1,366	2,119	California 2	1		[5]		[5]
								Nevada 2	2	5		1	6
								Oregon 3	6	24		15	39
								Oregon 4	1	5			5
								Oregon 5	2	10		7	17
								Total	12	44		23	67
Oregon 3	48	112.1	1,345	302	56	711	1,069	Idaho 1	16	13	31	119	163
								Oregon 2	7	14	14	74	102
								Oregon 6	2	2	2	7	11
								Total	23	29	47	200	276

Oregon 4	26	46.2	554	264		183	447	Idaho 1	13	16		76	22
								Oregon 2	1	2		1	3
								Oregon 3	3	7		5	12
								Total	16	25		82	107
Oregon 5	44	59.6	715	95	88	479	662	Oregon 2	2	6		5	11
								Oregon, other	9		4	38	42
								Total	11	6	4	43	53
Oregon 6	39	46.6	559	46	102	411	559						
Oregon, other	50	92.7	1,113			853	853	Oregon 2	3		11		11
								Oregon 3	8		37	4	41
								Oregon 5	37		196		196
								Oregon 6	3	1	8	3	12
								Total	50	1	252	7	260
Utah 1	169	263.7	3,164	360	216	1,929	2,505	Idaho 2	15	20	7	4	31
								Southeast Idaho	4		13		13
								Nevada 1	9	96			96
								Nevada 4	2	17			17
								Utah 2	26	394	11	35	440
								Utah 3	3	47			47
								Wyoming 4	5	5	5	5	15
								Total	58	579	36	44	659
Utah 2	271	380.1	4,561	1,102	422	2,170	3,694	Colorado, other	1		10		10
								Southeast Idaho	5		52	3	55
								Nevada 1	4	75			75
								Nevada 4	5	40			40
								Utah 1	10	18	8	111	137
								Utah 3	49	399	15		414
								Utah 8	6	104	4	18	126
								Uinta Basin	2		(4)		[3] 10
								Total	67	636	89	132	[2] 867
Utah 3	840	348.7	4,185	1,724	592	1,612	3,928	Utah 2	49	68	41	26	135
								Utah 4	7	17	9	10	45
								Utah 5	23	28	34	2	64
								Utah 7	4		6		6
								Uinta Basin	4		7		7
								Total	86	113	97	47	257

[2] See footnote 2, table 7.
[3] See footnote 3, table 7.
[4] Less than 500 sheep-months.

TABLE 13.—*Source of annual sheep-months use obtained in all areas by sheep classified in specified home grazing areas, Intermountain Region, 1938–39*—Continued

Home area of sheep	Total operators classified in home area	Number of sheep	Annual sheep-months requirement	Sheep-months use obtained in home area				Sheep-months use obtained outside home area[2]					
				Grazing district	National forest	Patented land	Total	Area	Operators	Grazing district	National forest	Patented land	Total
	Number	*Thousands*	*Thousands*	*Thousands*	*Thousands*	*Thousands*	*Thousands*		*Number*	*Thousands*	*Thousands*	*Thousands*	*Thousands*
Utah 4	205	240.2	2,882	535	159	1,289	1,983	Arizona 1	27	307		15	[1] 383
								Nevada 4	12	206		19	225
								Nevada 5	3	24			24
								Nevada unregulated	10				[1] 72
								Utah 3	30	163	8	8	179
								Utah 8	5		16		16
								Total	80	700	24	42	[1] 899
Utah 5	141	84.3	1,012	519	186	267	972	Colorado, other	1			9	9
								Utah 3	4	9	6	1	16
								Utah 4	2	3	6		9
								Utah 7	2	6			6
								Total	8	18	12	10	40
Utah 6	46	134.7	1,616	794	99	359	1,252	Colorado 1	3	31		37	68
								Colorado 3	5	35	23	42	100
								Colorado 4	11	25	30	58	133
								Colorado, other	3		17	35	52
								Utah 8	1	8		3	11
								Total	19	99	90	175	364
Utah 7	140	146.4	1,757	926	94	568	1,588	Colorado 1	1		5		5
								Colorado 3	4	8	14	47	69
								Colorado, other	1		8		8
								Utah 3	12	19	10	31	60
								Utah 5	1	1			1
								Utah 6	1	7			7
								Utah 8	3	8		8	16
								Uinta Basin	1				[2] 3
								Total	22	43	37	86	[1] 169

Utah 8	102	162.7	1,952	735	134	913	1,782
Uinta Basin	30	49.8	598		58	260	[3] 336
Wyoming 3	108	452.1	5,425	1,877	230	2,844	4,951
Wyoming 4	275	612.2	7,346	2,974	280	3,353	6,607
Wyoming, other	11	32.7	392	91	3	235	329
Total	5,031	6,844.6	82,132	21,737	7,838	40,268	[3] 70,594

Colorado 1	9	42	25	23	90
Colorado 6	3	3		2	5
Utah 2	3			36	36
Utah 6	1	4			4
Uinta Basin	5				[3] 6
Wyoming 4	4	20		9	29
Total	22	69	25	70	[3] 170
Utah 2	11		57	4	61
Utah 8	24	200		1	201
Total	24	200	57	5	262
Colorado 6	13	54	35	11	100
Colorado, other	19		208		208
Wyoming 4	6	56		9	65
Wyoming, other	12	39		62	101
Total	39	149	243	82	474
Southeast Idaho	9		29	5	34
Utah 1	15	22	21	91	134
Utah 8	11	5	36	12	53
Uinta Basin	3		6		6
Wyoming 3	6	42	16	71	129
Wyoming, other	36	47	291	45	383
Total	71	116	399	224	739
Wyoming 3	10	38		16	54
Wyoming 4	2	8		1	9
Total	11	46		17	63
	1,290	5,679	2,571	2,700	[3] 11,536

[3] See footnote 2, table 7.
[4] See footnote 3, table 7.

TABLE 14.—*Distribution of sheep-months use obtained in specified grazing areas, by sheep classified in the areas and by sheep from other areas, Intermountain Region, 1938–39*

Grazing area	All operators obtaining use in area	Total sheep-months use furnished by area	Sheep-months use obtained by sheep classified in area					Sheep-months use obtained by sheep classified in other areas					
			Operators	Grazing district	National forest	Patented land	Total	Home area of sheep	Operators	Grazing district	National forest	Patented land	Total
	Number	*Thousands*	*Number*	*Thousands*	*Thousands*	*Thousands*	*Thousands*		*Number*	*Thousands*	*Thousands*	*Thousands*	*Thousands*
Arizona 1	47	761	20	331	6	29	1 378	Utah 4	27	307	0	15	1 383
California 2	84	1,125	57	285	104	530	919	California, other	11	9	36	25	70
								Nevada 2	3	24	4	11	39
								Nevada 3	4	4	21	39	64
								Oregon 1	8	0	33	0	33
								Oregon 2	1	0	(2)	0	(2)
								Total	27	37	94	75	206
California, other	29	414	14	0	18	244	262	California 2	3	0	25	6	31
								Nevada 2	8	0	11	78	89
								Nevada 3	4	0	1	31	32
								Total	15	0	37	115	152
Colorado 1	147	2,107	124	543	217	1,110	1,870	Colorado 3	6	15	5	1	21
								Colorado 6	3	40	0	3	43
								Colorado, other	1	10	0	0	10
								Utah 6	3	31	0	37	68
								Utah 7	1	0	5	0	5
								Utah 8	9	42	25	23	90
								Total	23	138	35	64	237
Colorado 3	274	2,945	249	392	396	1,903	2,691	Colorado 1	5	(2)	26	1	27
								Colorado, other	11	5	42	11	58
								Utah 6	5	35	23	42	100
								Utah 7	4	8	14	47	69
								Total	25	48	105	101	254
Colorado 4	233	2,372	179	239	409	1,358	2,006	Colorado 3	5	50	4	10	64
								New Mexico	38	20	125	24	100
								Utah 6	11	25	50	58	133
								Total	54	95	179	92	366

Colorado 6	73	1,268	45	367	55	689	1,102	Colorado 1	8	19	5	21	45
								Colorado, other	4	6	4	6	16
								Utah 8	3	3	0	2	5
								Wyoming 3	13	54	35	11	100
								Total	28	82	44	40	166
Colorado, other	54	640	17	14	15	213	242	Colorado 1	7	0	35	10	45
								Colorado 3	4	0	29	16	45
								Colorado 6	1	0	21	0	21
								Utah 2	1	0	10	0	10
								Utah 5	1	0	0	9	9
								Utah 6	3	0	17	35	52
								Utah 7	1	0	8	0	8
								Wyoming 3	19	0	208	0	208
								Total	37	0	328	70	398
Idaho 1	265	5,773	171	1,005	874	3,374	5,253	Idaho 2	63	205	28	20	253
								Nevada 1	2	10	0	2	12
								Oregon 3	16	13	31	119	163
								Oregon 4	13	16	0	76	92
								Total	94	244	59	217	520
Idaho 2	649	6,385	589	1,456	667	3,994	6,117	Idaho 1	5	9	13	20	42
								Idaho 3	6	3	3	33	39
								Southeast Idaho	33	50	72	18	140
								Nevada 1	1	0	16	0	16
								Utah 1	15	20	7	4	31
								Total	60	82	111	75	268
Idaho 3	319	2,151	132	437	211	709	1,357	Idaho 2	32	160	0	31	191
								Idaho 4	1	1	0	(2)	1
								Southeast Idaho	154	409	95	98	602
								Total	187	570	95	129	794
Idaho 4	171	1,472	141	421	234	576	1,231	Idaho 2	24	0	148	0	148
								Idaho 3	9	53	23	17	93
								Total	33	53	171	17	241

[1] Total includes use obtained on other Federal lands, such as Indian Reservations and National Monuments.
[2] Less than 500 sheep-months.

TABLE 14.—*Distribution of sheep-months use obtained in specified grazing areas, by sheep classified in the areas and by sheep from other areas, Intermountain Region, 1938–39*—Continued

Grazing area	All operators obtaining use in area	Total sheep-months use furnished by area	Sheep-months use obtained by sheep classified in area					Sheep-months use obtained by sheep classified in other areas					
			Operators	Grazing district	National forest	Patented land	Total	Home area of sheep	Operators	Grazing district	National forest	Patented land	Total
	Number	*Thousands*	*Number*	*Thousands*	*Thousands*	*Thousands*	*Thousands*		*Number*	*Thousands*	*Thousands*	*Thousands*	*Thousands*
Southeast Idaho	432	4,358	378	0	653	3,139	[1] 4,039	Idaho 2	17	0	75	28	103
								Idaho 3	19	0	13	101	114
								Utah 1	4	0	13	0	13
								Utah 2	5	0	52	3	55
								Wyoming 4	9	0	29	5	34
								Total	54	0	182	137	319
Nevada 1	113	3,055	66	661	549	915	2,416	Idaho 1	5	15	71	0	86
								Idaho 2	20	49	87	17	153
								Southeast Idaho	6	132	0	(2)	132
								Nevada 3	1	16	27	16	59
								Nevada 4	2	9	3	26	38
								Utah 1	9	96	0	0	96
								Utah 2	4	75	0	0	75
								Total	47	392	188	59	639
Nevada 2	61	1,544	33	513	52	483	1,048	California 2	18	117	0	74	[1] 198
								California, other	1	2	0	13	15
								Nevada 1	5	128	0	142	270
								Nevada 3	2	3	0	4	7
								Oregon 2	2	5	0	1	6
								Total	28	255	0	234	[1] 496
Nevada 3	80	2,020	67	795	352	758	1,905	California 2	2	16	0	4	20
								California, other	2	4	5	10	19
								Nevada 1	5	27	0	0	27
								Nevada 2	4	44	0	5	49
								Total	13	91	5	19	115

Nevada 4	83	1,932	48	1,028	120	179	1,327	Nevada 1	16	298	0	25	323
								Utah 1	2	17	0	0	17
								Utah 2	5	40	0	0	40
								Utah 4	12	206	0	19	225
								Total	35	561	0	44	605
Nevada 5	5	42	(2)	0	0	0	0	Arizona 1	2	18	0	0	18
								Utah 4	3	24	0	0	24
								Total	5	42	0	0	42
Nevada, unregulated	(4)	491	(4)	0	0	0	0	Arizona 1	1				6
								Nevada 1	14				317
								Nevada 3	2				54
								Nevada 4	7				42
								Utah 4	10				72
								Total	34				[4] 491
New Mexico	(5)	484	38				[3] 474	Colorado 4	3				[5] 10
Oregon 1	24	321	24	18	31	272	321						
Oregon 2	116	2,282	94	588	165	1,366	2,119	California 2	5	0	3	17	20
								Nevada 2	3	7	0	3	10
								Oregon 1	1	0	6	0	6
								Oregon 3	7	14	14	74	102
								Oregon 4	1	2	0	1	3
								Oregon 5	2	6	0	5	11
								Oregon, other	3	0	11	0	11
								Total	22	29	34	100	163
Oregon 3	71	1,189	48	302	56	711	1,069	Idaho 1	6	10	0	18	28
								Oregon 2	6	24	0	15	39
								Oregon 4	3	7	0	5	12
								Oregon, other	8	0	37	4	41
								Total	23	41	37	42	120
Oregon 4	34	517	26	264	0	183	447	Idaho 1	7	39	0	26	65
								Oregon 2	1	5	0	0	5
								Total	8	44	0	26	70

[1] Total includes use obtained on other Federal lands, such as Indian Reservations and National Monuments.
[2] Less than 500 sheep-months.
[3] No operations were classified in Nevada 5, that is, no sheep operators were obtaining the major part of their use in this area. Some of them obtain use in "Nevada unregulated," in which case the sheep months are shown but the distribution is not known.
[4] No operators were classified in "Nevada unregulated." Only those sheep which grazed in one of the grazing areas were included in the study.
[5] Includes only those operators who are licensed or permitted to graze sheep in Colorado area 4. Distribution of use for these sheep in New Mexico was not obtained.

TABLE 14.—*Distribution of sheep-months use obtained in specified grazing areas, by sheep classified in the areas and by sheep from other areas, Intermountain Region, 1938–39*—Continued

Grazing area	All operators obtaining use in area	Total sheep-months use furnished by area	Sheep-months use obtained by sheep classified in area					Sheep-months use obtained by sheep classified in other areas					
			Operators	Grazing district	National forest	Patented land	Total	Home area of sheep	Operators	Grazing district	National forest	Patented land	Total
	Number	*Thousands*	*Number*	*Thousands*	*Thousands*	*Thousands*	*Thousands*		*Number*	*Thousands*	*Thousands*	*Thousands*	*Thousands*
Oregon 5	83	875	44	95	88	479	662	Oregon 2	2	10	0	7	17
								Oregon, other	37	0	196	0	196
								Total	39	10	196	7	213
Oregon 6	35	582	30	46	102	411	559	Oregon 3	2	2	2	7	11
								Oregon, other	3	1	8	3	12
								Total	5	3	10	10	23
Oregon, other	59	895	50	0	0	853	853	Oregon 5	9	0	4	38	42
Utah 1	219	2,942	169	360	216	1,929	2,505	Idaho 2	15	18	10	24	52
								Southeast Idaho	8	25	4	41	70
								Nevada 1	2	17	0	27	44
								Utah 2	10	18	8	111	137
								Wyoming 4	15	22	21	91	134
								Total	50	100	43	294	437
Utah 2	363	4,402	271	1,102	422	2,170	3,694	Nevada 4	3	10	0	26	36
								Utah 1	26	304	11	35	440
								Utah 3	49	68	41	26	135
								Utah 8	3	0	0	36	36
								Uinta Basin	11	0	57	4	61
								Total	92	472	109	127	708
Utah 3	945	4,675	840	1,724	592	1,612	3,928	Nevada 4	7	29	0	2	31
								Utah 1	3	47	0	0	47
								Utah 2	49	399	15	0	414
								Utah 4	30	163	8	8	179
								Utah 5	4	9	6	1	16
								Utah 7	12	19	10	31	60
								Total	105	666	39	42	747

Utah 4	228	2,179	205	535	150	1,289	1,983	Arizona 1	12	19	16	91	126
								Nevada 4	2	4	0	12	16
								Utah 3	7	17	9	19	45
								Utah 5	2	3	6	(2)	9
								Total	23	43	31	122	196
Utah 5	170	1,053	141	519	186	267	972	Utah 3	23	28	34	2	64
								Utah 4	5	0	16	0	16
								Utah 7	1	1	0	(2)	1
								Total	29	29	50	2	81
Utah 6	87	1,771	46	794	99	359	1,252	Colorado 1	9	83	0	2	85
								Colorado 3	15	244	0	37	281
								Colorado 4	14	116	0	22	138
								Colorado, other	1	4	0	0	4
								Utah 7	1	7	0	0	7
								Utah 8	1	4	0	0	4
								Total	41	458	0	61	519
Utah 7	146	1,600	140	926	94	568	1,588	Utah 3	4	0	6	0	6
								Utah 5	2	6	0	0	6
								Total	6	6	6	0	12
Utah 8	159	2,276	102	735	134	913	1,782	Colorado 1	10	50	0	21	71
								Colorado 3	1	5	0	1	6
								Colorado 6	1	5	0	5	10
								Utah 2	6	104	4	18	126
								Utah 6	1	8	0	3	11
								Utah 7	3	8	0	8	16
								Uinta Basin	24	200	0	1	201
								Wyoming 4	11	5	36	12	53
								Total	57	385	40	69	494
Uinta Basin	54	368	39	0	58	260	[1] 336	Utah 2	2	0	(2)	0	[1] 10
								Utah 3	4	0	7	0	7
								Utah 7	1	0	0	0	[1] 3
								Utah 8	5	0	0	0	[1] 6
								Wyoming 4	3	0	6	0	6
								Total	15	0	13	0	[1] 32

[1] Total includes use obtained on other Federal lands, such as Indian Reservations and National Monuments.
[2] Less than 500 sheep-months.

TABLE 14.—*Distribution of sheep-months use obtained in specified grazing areas, by sheep classified in the areas and by sheep from other areas, Intermountain Region, 1938–39*—Continued

Grazing area	All operators obtaining use in area	Total sheep-months use furnished by area	Sheep-months use obtained by sheep classified in area					Sheep-months use obtained by sheep classified in other areas					
			Operators	Grazing district	National forest	Patented land	Total	Home area of sheep	Operators	Grazing district	National forest	Patented land	Total
	Number	*Thousands*	*Number*	*Thousands*	*Thousands*	*Thousands*	*Thousands*		*Number*	*Thousands*	*Thousands*	*Thousands*	*Thousands*
Wyoming 3	135	5,226	108	1,877	230	2,844	4,951	Colorado 6	11	56	9	27	92
								Wyoming 4	6	42	16	71	129
								Wyoming, other	10	38	0	16	54
								Total	27	136	25	114	275
Wyoming 4	309	6,827	275	2,974	280	3,353	6,607	Colorado 6	4	51	5	0	56
								Southeast Idaho	13	34	0	12	46
								Utah 1	5	5	5	5	15
								Utah 8	4	20	0	9	29
								Wyoming 3	6	56	0	9	65
								Wyoming, other	2	8	0	1	9
								Total	34	174	10	36	220
Wyoming, other	89	813	11	91	3	235	329	Wyoming 3	12	39	0	62	101
								Wyoming 4	36	47	291	45	383
								Total	48	86	291	107	484
Total		82,132	5,031	21,737	7,838	40,268	[1] 70,594			5,679	2,571	2,700	[1] 11,538

[1] Total includes use obtained on other Federal lands, such as Indian Reservations and National Monuments.

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